

**RESEARCHES CONCERNING PRODUCTION  
DIVERSIFICATION AND INTEGRATION IN ORDER TO  
INCREASE PROFITABILITY AND COMPETITIVENESS OF  
FAMILY SERICICULTURAL FARMS**

**CERCETARI PRIVIND DIVERSIFICAREA PRODUCTIEI SI  
INTEGRAREA IN SCOPUL CRESTERII PROFITABILITATII  
SI COMPETITIVITATII FERMELOR SERICICOLE  
FAMILIALE**

POPESCU AGATHA\*, MATEI ALEXANDRA \*\*,  
SLADESCU VIORICA\*\*\*

*\*University of Agricultural Sciences and Veterinary Medicine, Bucharest, Romania*

*\*\* S.C.SERICAROM S.A. , Research Development Department*

*\*\*\*National University of Arts*

*This study aimed to present different management variants for family sericicultural farms .These variants assures family reproduction sericicultural integrated management along production – processing – marketing chain, a larger range of marketable products, a better marketing for unreeling cocoons, increased income and profit for silk worm breede, a higher profitability and competitiveness of the agricultural unit. The matrix of experimental variants combinations between Mulberry tree culture and Silk worm rearing show that the most profitable alternative is CD V3 + VM V2, which assures Lei 556,874 profit during the first years of farm activity. The matrix of integrated combinative variants between Mulberry the culture, Silk worm rearing and unreeling cocoons processing in handicrafts (P5) show that the most profitable alternative is CDV3 + VMV1 + P5, that is 0.5 ha mulberry tree plantation + 0.2 ha Seeding field + 0.1. ha Sowing field 1 + 0.2 ha Pricking out field, silk worm rearing for delivering 1,000 egg boxes, 10 kg silk filament, 25 kg fresh pupa and 1,298 Woven belts, assuring Lei 504,336 profit during the 8 years of farm operating. No matter what variant of integrated management is chosen by silk worm Breeders as long as economical and financial performances are superior the ones which are obtained in case of the lack of integration .*

**Key words:** production, diversification, integration, sericicultural family farms

### **Introduction**

After Romania's entry into the E.U., sericulture is being challenged by simultaneous requirements for more diversified products, increased productivity and competitiveness. Many funds are provided to develop sericulture as an

additional income source for population living in the country side. Under these conditions, silk worm rearing can not be done any more in a traditional way and just for producing silk cocoons. Production diversification and integration seems to become important tools for developing sericulture on a new basis looking for a higher profit and productivity .This study comes to present some alternatives to silkworm breeders leaving them the possibility to chose the one most appropriate to their own conditions and financial capital. The large range variants assure integrated management of a family reproduction sericultural farm along the production – processing – marketing chain, production diversification, a more effective marketing for unreeling cocoons (byproducts), increased income and profit for silk worm breeder and increase of profitability and competitiveness of sericultural unit (1,2,3).

### **Materials and Methods**

Several models of integrated production management were set up in the following experimental variants :

**a) In Mulberry tree culture(CD) :**

V1 – 0.5 ha mulberry tree plantation + 0.5 ha layer maker field ;

V2 - 0.5 ha mulberry tree plantation + 0.2 ha Seeding field + 0.1. ha Sowing field 1 + 0.2 ha Pricking out field 2 ;

V3- 0.5 ha Mulberry tree plantation + 0.2 ha Seeding field + 0.1. ha Layer maker field + 0.2 ha Sowing field 1.

**b) In Silk worm rearing (VM):**

V1-Producing 400 kg silk cocoons in order to obtain 1,000 egg boxes , 10 kg silk filament and 25 kg fresh pupae and , in addition, 50 kg unreeling cocoons for delivery as such or processed in 10 handicrafts alternatives , 10 kg lint and 2,000 kg bedding remains;

V2 – Producing 400 kg silk cocoons , of which 300 kg reproduction cocoons for delivery to other producers in order to obtain eggs , 100 kg silk cocoons for obtaining 10 kg silk filament and 25 kg fresh pupae and, in addition, 10 kg lint and 2,000 kg bedding remains.

**c) Integration between Mulberry tree culture (CD) and Silk worm rearing (VM):** a number of 36 combinative variants were set up and evaluated .

Costs, incomes, profit were estimated in Lei ( exchange rate 1 Lei = 3,6 Euro ) , in a cumulated manner for the first 8 years of activity for each experimental variant . The hierarchization of variants was established based on cumulated profit for 8 years of activity, identifying the most and the less profitable ones.

In this purpose , the following mathematical formulas were used:

$$Pt = \sum_{j=1}^m P_{jt} \quad , \text{ where : } Pt = \text{total profit at farm level} \quad , j = \text{field of production}$$

integration , m = number of fields of production integration ,  $P_{jt}$  = total profit, cumulated for many operating years .

$$Pt = \sum_{i=1}^n Vt_i - \sum_{i=1}^n Ct_i \quad , \text{ where : } Vt_i = \text{total income in the year } i =$$

1,2,3...n and  $Ct_i$  = total costs in the year  $i = 1,2,3...n$ .

The estimated profit was compared among variants in order to identify the one which assures the highest profitability and establish the variant hierarchization.

## Results and Discussions

**In Mulberry tree culture.** Taking into account the cumulated financial results for 8 years of activity, the range of the three experimental variants is V3, V2 and V1. V3 variant assures Lei 205,719 profit, V2 Lei 161,062 and V1 Lei 11,348. Therefore, the most profitable variant is V3 and the less profitable one is V1.

Table 1

Hierarchisation of combinative variants between Mulberry tree culture (CD) and Silk worm rearing (VM) based on the cumulated financial results during the first 8 years of activity in the family reproduction sericultural farm

Combinative Variant	Cumulated Profit for the first 8 years of activity Lei ( 1 Lei = 3.6 Euro)	Combinative variant position
CDV3 + VMV2	556,874	1
CDV2 + VMV2	552,086	2
CDV1 + VMV2	402,372	3
CDV3 + VMV1	177,885	4
CDV2 + VMV1	173,096	5
CDV1 + VMV1	23,382	6

**In Silk worm rearing,** the most profitable variant is V2, assuring the highest income, the lowest costs, the highest profit and profit rate. V2 assures Lei 84,150 income per year 2 twice more than V1, it requires Lei 18,979 costs per year , that is 2 times less than V1. As a result, it brings Lei 65, 171 profit and 3,43 higher profit rate per han V1.

**Integrating Mulberry tree culture (CD) and Silk worm rearing (VM)** and taking into account the experimental variants combination matrix, the most profitable combinative variant is CD V3 + VM V2, which assures Lei 556,874 during the first 8 years of activity.

Table 2

Hierarchisation of combinative production integrated variants between Mulberry tree culture, Silk worm rearing (V1) and unreeling cocoons processing (P) based on cumulated profit for the first 8 years of activity

Integrated cumulative variants	Cumulated profit for 8 years of activity Lei (1 Lei = 3.6 Euro)	Variant position
CDV3 + VMV1P5	504,356	1
CDV2 + VMV1P5	499,547	2
CDV3 + VMV1P10	469,483	3
CDV2 + VMV1P10	464,694	4
CDV3 + VMV1P4	381,982	5
CDV2 + VMV1P4	377,193	6
CDV1 + VMV1P5	349,833	7
CDV3 + VMV1P3	341,367	8
CDV2 + VMV1P3	336,579	9
CDV3 + VMV1P2	320,893	10
CDV2 + VMV1P2	316,105	11
CDV3 + VMV1P6	315,661	12
CDV1 + VMV1P10	314,981	13
CDV2 + VMV1P6	310,873	14
CDV3 + VMV1P8	297,823	15
CDV2 + VMV1P8	293,035	16
CDV3 + VMV1P9	283,895	17
CDV2 + VMV1P9	279,106	18
CDV3 + VMV1P7	276,468	19
CDV2 + VMV1P7	271,679	20
CDV1 + VMV1P4	227,479	21
CDV2 + VMV1P1	221,439	22
CDV3 + VMV1P1	196,228	23
CDV1 + VMV1P3	186,865	24
CDV1 + VMV1P2	166,391	25
CDV1 + VMV1P6	161,159	26
CDV1 + VMV1P8	143,321	27
CDV1 + VMV1P9	129,392	28
CDV1 + VMV1P7	121,935	29
CDV3 + VMV1P1	41,725	30

**In Silk unreeling cocoons Processing**, ten variants were set up using handicraft technologies. The amount of 50 kg unreeling cocoons was processed in decorative art products, cloth accessories, fabrics, other materials, assuring a 24.29 times higher profit than in case that cocoons are delivered as such in the market.

The most profitable handicrafts are in order: P5 (Woven belts), P10 (“Story” decorative poster), P4 (Multipurpose Bags), P3 (Fancy Fabric 1 x 0.7 m for Spring and Summer season cloths), P2 (Thick fabric 1 x 0.8 m for Autumn-Winter season cloths), P6 (Knitted belts), P8 (Flower brooches), P9 (“Portrait” decorative poster), P7 (Rustic Necklaces) P1 (Colored Shantung type threads).

**Integrating Mulberry tree culture, Silk worm rearing and unreeling cocoon processing in handicrafts**, a farmer could obtain a profit ranking between Lei 464,694 and Lei 504, 336 during the first 8 years of activity, if he decides to process cocoons in Woven belts (P5) or “Story” decorative posters (P10).

The most profitable variant is CDV3 + VMV1P5, that is 0.5 ha mulberry tree plantation + 0.2 ha Seeding field + 0.1. ha Sowing field 1 + 0.2 ha Pricking out field 2, silk worm rearing for delivering 1,000 egg boxes, 10 kg silk filament, 25 kg fresh pupae and 1,298 Woven belts, assuring Lei 504,336 profit during the 8 years of farm operating.

The CDV1 + VMV1P1 variant, meaning 0.5 ha mulberry tree plantation + 0.5 ha layer maker field, silk worm rearing for producing 1,000 egg boxes, 10 kg silk filament, 25 kg fresh pupae and 43.50 kg Colored Shantung type threads assures the lowest profit Lei 41,725 during the 8 years of activity .

The combinative variants proposed to be implemented in practice represent solutions which could be selected by silk worm breeders or other people willing to develop business in this area, according to their material and financial resources.

These variants assure integrated management of a family reproduction sericultural farm along the production – processing – marketing chain, production diversification, a more effective marketing for unreeling cocoons (byproducts), increased income and profit for silk worm breeder and increase of profitability and competitiveness of sericultural unit.

## Conclusions

1. A number of 30 integrated management variants for the family sericultural farm were set up as alternative solutions of high interest to silk worm breeders as long as traditional sericulture just for producing silk cocoons is lacked of competitiveness under the new requirements imposed to Romanian agriculture after its entry into the EU structures.

2. These variants assures family reproduction sericultural integrated management along production – processing - marketing chain, a larger range of marketable products, a better marketing for unreeling cocoons, increased income and profit for silk worm breeder, a higher profitability and competitiveness of the agricultural unit .

3. The matrix of experimental variants combinations between Mulberry tree culture and Silk worm rearing show that the most profitable alternative is CD V3 + VM V2, which assures Lei 556,874 profit during the first years of farm activity.

4. The matrix of integrated combinative variants between Mulberry tree culture, Silk worm rearing and unreeling cocoons processing in handicrafts (P5) show that the most profitable alternative is CDV3 + VMV1 + P5, that is 0.5 ha mulberry tree plantation + 0.2 ha Seeding field + 0.1. ha Sowing field 1 + 0.2 ha Pricking out field 2, silk worm rearing for delivering 1,000 egg boxes, 10 kg silk filament, 25 kg fresh pupae and 1,298 Woven belts, assuring Lei 504,336 profit during the 8 years of farm operating .

5. No matter what variant of integrated management is chosen by silk worm breeders as long as economical and financial performances are superior the ones which are obtained in case of the lack of integration .

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