

RESEARCH CONCERNING APIARY SIZE, HONEY YIELD AND BEEKEEPERS' INCOME IN TELEORMAN COUNTY

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Abstract

The paper aimed to analyze apiary size, honey production and beekeepers' income in Teleorman County using a questionnaire based survey on a sample of 16 apiculturists. The processing of answers pointed out that in 2011, the interviewed beekeepers kept 1,248 bee families which produced 32,206 kg honey, meaning 25.80 kg/bee family. Honey was sold at Lei 9.67 lei/kg in average, total income accounted for Lei 338,083, that is Lei 21,130 in average per beekeeper and Lei 270.89 per bee family. Apiary size varied between 150 bee families (1 apiary = 6,25 %), 50-100 bee families (81.25 %) and the remaining 12.50 % less than 40 bee families. About 86.23 % of honey production was achieved in the apiaries whose size belonged to the category 50-100 bee families and 8.19 % in the apiary with more than 100 bee families. About 73.20 % of total profit was carried out in the apiaries keeping 50-100 bee families and 18.74 % in the apiary with over 100 bee families. As a conclusion, beekeeping is a profitable sector of agriculture in Teleorman County and for this reason beekeepers are stimulated to increase the number of bee families per apiary, honey quality and finally their income and living standard.

Key words: beekeeping, questionnaire survey, Teleorman County

INTRODUCTION

Beekeeping development is stimulated by the increased honey demand on the European market and by the insufficient offer [7].

The growth of honey production depends on the number of bee families and their power, variety of food resources, bee families maintenance and health [1,2,3,4].

Apiary size is the major factor which determines the extracted honey production and is closely linked to production cost and beekeepers income [8,9,10].

Romania's geographical position and large variety of cultivated and wild flora are favorable factors for the development of beekeeping. Despite of its long tradition in the field, honey consumption is still small, about 0.9 kg/inhabitant/year, but as long as on the EU market demand is not yet covered by offer, Romania has a big chance for honey export [5,6].

Economic impact of beekeeping is very important both for beekeepers, communities in the rural areas, processors and retailers [2,8,10].

Therefore, Romanian apiculturists have to be encouraged to develop their business, increase honey quality and export more honey on the EU market.

In this context, the paper purpose was to present a study on apiary size, honey production per bee family, and beekeepers income in Teleorman County, an area less specific for beekeeping but where the number of apiculturists and the number of bee families is continuously increasing.

MATERIALS AND METHODS

The study was carried out in the month of June, 2012 on a sample of 16 beekeepers of various ages, training level, professions and experience in beekeeping. They took part to an opinion test regarding the statement of apiculture in the Teleorman County, using a structured questionnaire based survey. The main aspects approached in this study are the following ones: socio-professional characteristics of the interviewed individuals, results obtained in beekeeping in the year 2011 regarding: number of bee families,

honey production per bee family, extracted honey production, marketed honey and its structure by honey type (acacia, linden, poliflora, sun flower etc), average selling price, selling procedures, beneficiaries, income from marketed honey, income per beekeeper, per honey kilogram and per bee family, inputs bought for apiary modernization, operating and business development, the major problems beekeepers are facing in Teleorman County which is not a suitable area for apiculture.

The data collected from questionnaires were statistically processed according to the marketing research procedures specific for such a study.

RESULTS AND DISCUSSIONS

Beekeepers structure according to their locality of origin included 18.75 % respondents from Alexandria, 12.50 % from Talpa and 6.25 % from other 14 ocalities of the Teleorman County (Table 1).

Table 1. Beekeepers' structure by apiary location

Locality		Locality	
Alexandria	No. 3 % 18,75	Brânceni	Nr. 1 % 6,25
Călinești	No. 1 % 6,25	Tigănești	Nr. 1 % 6,25
Slobozia	Nr. 1 % 6,25	Frâsinet	Nr. 1 % 6,25
Ulmeni	Nr. 1 % 6,25	Scorțeni	Nr. 1 % 6,25
Prunaru	Nr. 1 % 6,25	Roșiori	Nr. 1 % 6,25
Săcele	Nr. 1 % 6,25	Ciuperceni	Nr. 1 % 6,25
Talpa	Nr. 1 % 12,50		

Beekeepers age structure was the following one: 43.75 % individuals between 51 and 60 years old, 25 % individuals belonged to 41-50 years category, 18.75 % interviewees were 31-40 years old and 42.54 % over 60 years, reflecting that about 75 % beekeepers were between 40 and 60 years old (Tabel 2).

Beekeepers sex structure was the following one: 93.75 % men and 6.25 % women, reflecting that the activities in apiary are preferred by men, but they recognized that

sometimes, mainly during honey extraction they are helped by their wives and even some close friends.

Table 2. Beekeepers' distribution by age category

	20-30 years	31-40 years	41-50 years	51-60 years	Over 60	Total
No.	-	3	4	7	2	16
%	-	18.75	25.00	43.75	12.50	100.00

Beekeepers structure based on their experience in apiculture showed that 50 % interviewees had 11-20 years of experience, 37 % less than 10 years and 12.50 % over 20 years (Table 3).

Table 3. Beekeepers' structure according to their experience in beekeeping

	1-5 years	6-10 years	11-15 years	16-20 years	Over 20 years	Total
No.	3	3	4	4	2	16
%	18.75	18.75	25.00	25.00	12.50	100

Beekeepers' structure based on their training level showed that 50 % of them were highschool leavers, 25 % attended 10 years of school, and 25 % interviewees graduated a higher education institution (Table 4).

Table 4. Beekeepers' structure based on their training level

	Higher education graduates	Highschool leavers	Training 10 years of school	Total
No.	4	8	4	16
%	25.00	50.00	25.00	100

From a juridical point of view, all the interviewed beekeepers were „Authorized Physical Person” (PFA) and members of Beekeepers Association, Teleorman branch.

Beekeepers structure according to apiary size in terms of number of bee families. Most of beekeepers have over 50 bee families and only 12.50 % have between 20 and 40 bee families, 37.50 % have 81-90 bee families, 18.75 % have 51-60 bee families, 12 % have 61-70 bee families, 6.25 % have 71-80, 91-100 and over 100 bee families (Table 5).

Table 5. Beekeepers' distribution based on apiary size (No. of bee families)

	10-20 bee fam.	21-30 bee fam.	31-40 bee fam.	41-50 bee fam.	51-60 bee fam.	61-70 bee fam.	71-80 bee fam.	81-90 bee fam.	91-100 bee fam.	Over 100 bee fam.	Total
No.	-	1	1	-	3	2	1	6	1	1	16
%	-	6.25	6.25	-	18.75	12.50	6.25	37.50	6.25	6.25	100

Distribution of number of bee families by apiary size is presented in Table 6. A number of 532 bee families are kept in apiaries whose size belongs to 81-90 category, 14.10 %, that is 176 bee families are in apiaries of 51-60 category, 12.05 %, that is 150 bee families are kept in only one apiary, the largest in the Teleorman County, 11.21 %, that is 140 bee families are kept in an equal number in two apiaries belonging to 61-70 category (Table 6).

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Table 6. Distribution of bee families by apiary size category

	21-30 bee fam.	31-40 bee fam.	41-50 bee fam.	51-60 bee fam.	61-70 bee fam.	71-80 bee fam.	81-90 bee fam.	91-100 bee fam.	Over 100 bee fam.	Total
No.	30	40	-	176	140	80	532	100	150	1248
%	2.40	3.20	-	14.10	11.21	6.41	42.62	8.01	12.05	100

Structure of apiaries according to average honey production per bee family reflected that 6 apiaries, that is 37.50 % of their total number, produced between 21-25 kg honey per bee family, 5 apiaries, that is 31.25 % carried out 16-20 kg honey per bee family, 12.50 % achieved 26-30 kg honey per bee family and 18.75 % apiaries produced over 30 kg honey per bee family (Table 7).

family reflects that 30.60 % bee families produced 16-20 kg honey per bee family, 34.93 % between 21-25 kg/bee family, 11.21 % achieved 26-30 kg honey/bee family and 23.26 % over 30 kg honey per bee family (Table 9).

Table 7. Distribution of apiaries according to honey production per bee family

	Less than 10 kg	11- 15 kg	16- 20 kg	21- 25 kg	26- 30 kg	Over 30 kg	Total
No.	-	-	5	6	2	3	16
%	-	-	31.25	37.50	12.50	18.75	100

Table 8. Distribution of extracted honey by category of honey yield

	Less 10 kg	11- 15 kg	16- 20 kg	21- 25 kg	26- 30 kg	Over 30 kg	Total
No.	-	-	6,886	10,650	4,200	10,470	32,206
%	-	-	21.38	33.06	13.04	32.52	100

Distribution of extracted honey according to the category of honey yield. About 33.06 % honey production was achieved in apiaries where honey yield varied between 21-25 kg/bee family, 32.52 % honey was obtained in apiaries with over 30 kg honey per bee family, 21.38 % was extracted in apiaries with 16-20 kg honey per bee family and 13.04 % was carried out in apiaries where production was 26-30 kg honey per bee family (Table 8).

Table 9. Distribution of bee families according to the category of honey production per bee family.

	16-20 kg	21-25 kg	26-30 kg	Over 30 kg	Total
No. of bee families	382	436	140	290	1248
%	30.60	34.93	11.2	23.26	100

Distribution of bee families according to the category of honey production per bee

Honey yield by production category varied between 18.02 kg/bee family for 16-20 kg category and 36.10 kg/bee family for the category over 30 kg. The average honey production per bee family was 25.80 kg, taking into consideration all the 1,248 bee families kept by the interviewed apiculturists (Table 10).

Table 10. Honey yield by production category (Kg/bee family)

16-20 kg	21-25 kg	26-30 kg	Over 30 kg	Total
18.02	24.42	30.00	36.10	25.80

Distribution of honey production according to apiary size. About 8.19 % honey production was achieved in apiaries with over 100 bee families, 33.49 % in apiaries with 81-

90 bee families, 9.31 % in apiaries with 91-100 bee families, 8.19 % honey was achieved in apiaries with 71-80 bee families, 10.09 % honey is carried out in apiaries with 61-70 bee families and 15.15 % in apiaries with 51-60 bee families. Only 5.58 % honey was obtained in apiaries with less than 40 bee families (Table 11).

Table 11. Distribution of honey production according to apiary size(kg)

21-30 bee fam.	31-40 bee fam.	41-50 bee fam.	51-60 bee fam.	61-70 bee fam.	71-80 bee fam.	81-90 bee fam.	91-100 bee fam.	Over 100 bee fam.	Total
600	1,200	-	4,880	3,250	2,640	10,786	30,000	5,850	32,206
1.86	3.72	-	15.15	10.09	8.19	33.49	9.31	8.19	100

Honey yield by apiary size category varied between 20 kg/bee family in the apiaries where 21-30 bee families were kept and 39 kg/bee family in the apiaries with over 100

bee families. Also, a yield of 33 kg/bee family was achieved in the apiaries with 71-80 bee families, in general in the ones having between 50 and 100 bee families (Table 12).

Table 12. Honey yield by apiary size category

21-30 bee fam.	31-40 bee fam.	41-50 bee fam.	51-60 bee fam.	61-70 bee fam.	71-80 bee fam.	81-90 bee fam.	91-100 bee fam.	Over 100 bee fam.	Total
20	30	-	27.72	23.21	33.	20.27	30	39	25.80

The extracted honey was entirely sold. The structure of the marketed honey showed that acacia honey was achieved just in 10 apiaries (62.50 %), linden honey was carried out in a few apiaries (12.50 %), poliflora honey was carried out in 13 apiaries (81.25 %) and sun flower honey was produced in 13 apiaries (81.25 %). Honey was marketed especially in bulk, but also packed in cans and glass jars. In the Teleorman County honey was obtained conventionally, no apiary produced organic honey.

The main beneficiaries were represented by Beekeepers Local Association, but also by direct clients.

Honey sale price varied according to honey type (acacia, linden, poliflora, sunflower etc) and beneficiary. Acacia honey was sold for the best price, while the other honey types were marketed for a similar price. The average purchasing price offered by Beekeepers Association varied between Lei 7.5-8.5 per kg according to honey type. But for direct clients, sale price was higher

ranging between Lei 9.5 per kg and Lei 20 per kg. The average sale price was Lei 9.67 per honey kg, taking into account all the honey marketed by the interviewed beekeepers.

Income from marketed honey accounted for Lei 338,083 for the whole sample representing Teleorman County. Income varied according to apiary size category. It was noticed that over 74 % income was obtained by the beekeepers keeping 50-100 bee families and 18.74 % income was earned by the beekeeper keeping 150 bee families (Table 13).

Income per beekeeper, income per bee family and income per honey kilogram. Taking into account that the total income earned by all 16 beekeepers accounted for Lei 338,083 and resulted from 32,206 kg marketed honey produced by 1,248 bee families, income per beekeeper in the year 2011 was Lei 21,130, meaning Lei 270.89 per bee family and Lei 10.49 lei per honey kg (Table 14).

Table 13. Income distribution by apiary size category (Lei)

21-30 bee fam.	31-40 bee fam.	41-50 bee fam.	51-60 bee fam.	61-70 bee fam.	71-80 bee fam.	81-90 bee fam.	91-100 bee fam.	Over 100 bee fam.	Total
5,100	22,200	-	44,260	28,735	22,080	99,958	52,500	63,250	338,083
1.50	6.56	-	13.09	8.50	6.53	29.56	15.52	18.74	100

Table 14. Income per beekeeper, income per bee family and income per honey kilogram

Total Income Lei	Extracted Honey kg	No. of Bee Families	Income/Beekeeper Lei/person	Income/Bee family Lei/Bee family	Income/kg Honey Lei/Kg	No. of Beekeepers
338,083	32,206	1,248	21,130	270.89	10.49	16

Inputs bought by beekeepers in 2011 for apiary modernization and keeping bee families are presented in Table 15. Most of beekeepers bought combs and frames, 68.75 %, 18,75 % beehives, 25 % apiculturists bought biostimulators, 12.50 % bought bee queens,

12.50 % purchased apiary inventory, 6.25 % apiculturists bought masks, coats, bee queen boxes, honey extractor, nails, wire, fuel and 56.25 % bought medicines for bee families treatment.

Table 15. Inputs bought by beekeepers in 2011

Input	No. of beekeepers	%	Input	No. of beekeepers	%
Combs and frames	11	68.75	Wire tacks	1	6.25
Beehives	3	18.75	Wire	1	6.25
Beekeepers mask	1	6.25	Fuel (Diesel)	1	6.25
Beekeeper coat	1	6.25	Bee queens	2	12.50
Medicines	9	6.25	Biostimulators	4	15.00
Queen boxes	1	6.25	Inventory: knives, chisels	2	12.50
Honey extractor	1	6.25	Total	16	100.00

The major problems beekeepers from Teleorman County were facing in 2011 are presented in Table 16.

Table 16. Major problems that beekeepers had in 2011 in Teleorman County

Problem	No. of beekeepers	%
Crop spraying with insecticides and pesticides which have a long remanence and killed bee families; spraying advertising was not done in time or at all	5	31.25
Crop spraying maintenance during pickings	7	43.75
Difficulties regarding honey marketing	3	18.75
Lack of meliferous crops	1	6.25
Low purchasing price offered by honey processors	1	6.25
Lack of antibiotics to treat bee bacterian diseases	1	6.25
Hard winter which affected the bee families	1	6.25
New self polynating varieties for technical crops which do not allow bees to collect nectar	1	6.25
Honey steelers which impose to pay guardians to protect bee families in pastoral pickings	1	6.25

Clients who bought honey are presented in Table 17.

The most profitable bee products in beekeepers' opinion are honey, wax, combs

with honey, propolis (Table 18). All the interviewed beekeepers considered that beekeeping is a profitable activity bringing them additional income.

Table 17. Honey beneficiaries

Name of client	No. of beekeepers who sold honey to this client	Share %	Name of client	No. of beekeepers who sold honey to this client	Share %
Albina SA Bragadiru	2	12.50	Medicofarma Bujoreni	1	6.25
Atlanta Slobozia	3	18.75	Agro Market Roşiorii de Vede	1	6.25
Agro Market Alexandria	1	6.25	Piatra Fair	1	6.25
Albina Cooperative Alexandria	8	50.00	Apicola Pastoral	1	6.25
Private persons	10	62.50	Georgescu Jilava	1	6.25
Dobre and Sons Baicoi	1	6.25	Akibud Gorj Tg. Jiu		
Biofar SRL Alexandria	1	6.25			

Table 18. Profitable bee products

	Honey	Wax	Polen	Propolis	Combs	Virgin wax
No of beekeepers	14	8	2	4	1	1
%	87.50	50	12.50	25.00	6.25	6.25

CONCLUSIONS

The 16 apiculturists from the Teleorman County used in this survey owned 1,248 bee families in 2011 and produced 32,206 kg honey, meaning 25.80 kg in average per bee family. Honey was marketed for Lei 9.67 average price per honey kilogram bringing Lei 338,083 income. This means that an apiculturist earned Lei 21,130 in 2011 from marketed honey, Lei 270.89 per bee family and Lei 10.49 per honey kilogram.

Only one beekeeper, representing 6.25 % owned the highest number of bee families (150 bee families), but the majority of beekeepers, more exactly 81.25 % owned apiaries with 50-100 bee families and just 12.50 % less than 40 familii albine.

Honey yield varied between 21.38 kg and 33.06 kg per bee family, reflecting a low performance deeply influenced by bee families feeding in close connection with climate and other factors.

About 5.58 % honey production was produced by the apiaries with less than 40 bee families, 8.19 % was achieved in the apiary with 150 bee families and 86.23 % in the apiaries with 50-100 bee families.

All these figures reflect that apiaries are still small sized in Romania compared to other countries, and honey performance per bee family is still at a low level.

As a conclusion, apiary size has to be increased in order to produce more honey and beekeepers to get a higher income.

The subsidies and funding coming from the EU in the last years have been an important financial support and a strong incentive to encourage beekeepers to keep more bee families and improve honey production and their income and living standard.

As a conclusion, beekeeping is a profitable activity in Teleorman County even thou beekeepers are facing with some problems regarding beehives transportation, pickings and marketing.

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