

RESEARCH ON BEE KEEPING DEVELOPMENT IN THE SOUTHERN ROMANIA – A QUESTIONNAIRE BASED SURVEY

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Abstract

The paper aimed to identify beekeepers' opinion on the development of apiculture in the Southern Romania based on a structured questionnaire based survey. In this purpose, a sample of 60 beekeepers from Calarasi, Ialomitza and Prahova counties answered 34 questions logically listed. The answers were statistically processed according to the specific marketing research methods and the following results were obtained: average apiary size was 67.4 bee families, a number of 4,044 bee families are kept in the 60 apiaries considered in the study and their honey production accounted for 105,161 kg, meaning 26 kg per bee family in 2011. About 55% beekeepers own between 50 and 100 bee families per apiary, 38 % less than 50 and 7 % over 100 bee families. Honey production depends on the number of bee families but also on bee feeding, pickings opportunities, climate conditions, maintenance during winter season. In 2011, the 60 beekeepers earned Lei 20,142,760, meaning Lei 298.75 per bee family from honey sold on the domestic market. As a conclusion, despite that apiary size and honey yield are still very small specific to subsistence farms compared to other countries, beekeeping is continuously developing in Romania being a profitable sector of agriculture. The unbalanced demand/offer ratio on the Western European market is a chance to increase honey production, to intensify export and to improve beekeepers' income.

Key words: beekeeping, honey, production, questionnaire based survey, Southern Romania.

INTRODUCTION

Beekeeping is among the priorities of the EU agricultural policy taking into account the increased honey demand in the common market and mainly in the Western countries (Popescu, 2010).

Romania has a long tradition and an exceptional meliferous potential and based on its honey production it is situated among the most important producing and exporting countries (Popescu, 2010)

Beekeeping is suitable to hilly areas but also it is practiced in the plain regions in apiaries of various size, whose average is ranking between 20 and 30 bee families at country level, being specific to subsistence farms (Bodescu et al., 2009). Beekeepers are independent producers, most of them operating as physical authorized person with a poor bookkeeping regarding expenditure and income, but also as members of beekeepers' association (Popescu, 2012).

According to the EU regulation, important subsidies and funds are allotted per bee family stimulated beekeepers to increase the

number of bee families and produce more and higher quality honey (Vural et al., 2006).

In this context, the paper purpose was to analyze the status of apiculture development in the South part of Romania using an opinion test among beekeepers who own subsistence apiaries whose number is predominant in the country.

MATERIALS AND METHODS

The research was carried out in the period April-November 2012, using a sample of 60 beekeepers from three counties situated in the South part of Romania: Calarasi, Ialomitza and Teleorman. Their opinion on various aspects regarding the development of apiculture in the area was collected using a questionnaire based survey, an usual method for such a marketing research (Tull et al, 1976).

The beekeepers answered 34 questions concerning the activity carried out in the year 2011 and their responds were statistically processed and interpreted.

The main indicators used in this study were the following ones: socio-professional characteristics of the individuals selected in the sample (number of beekeepers by county, age, gender, experience in the field, training level), number of bee families, extracted and marketed honey, apiary structure in terms of the number of bee families and extracted honey production, honey yield, honey marketing, clients, income and beekeepers structure by category of income resulted from sold honey, income distribution by apiary size, income per beekeeper, bee family and kg honey, and major problems beekeepers are facing.

RESULTS AND DISCUSSIONS

Beekeepers distribution by county of origin.

A number of 20 beekeepers, representing 33.3 % of the sample were selected from each of the three counties: Calarasi (CL), Ialomitza (IL) and Prahova (PH) involved in this study.

Beekeepers' distribution by age category:

3.34 % interviewed persons were younger than 30 years, 16.66 % were of 31-40 years old, 31.66 % of them belonged to the category 41-50 years, 35 % belonged to the category 51-60 years and 13.34 % were over 60 years old.

Beekeepers' gender structure showed that 83.34 % of the respondents were men and 16.66 % women, reflecting that apiculture is mainly practiced by men.

Beekeepers' training level. Most of the interviewed persons, 75 %, were high school leavers and 25 % graduated a higher education institution.

Beekeepers' experience in the field. About 20 % respondents practiced apiculture only during the last 5 years, 40 % have 6-10 years experience, 25 % have 11-15 years experience, 8.83 % have 16-20 years practice and 6.67 % are very experienced with over 20 years practice in apiculture.

All the 60 interviewed beekeepers are members of Local Beekeepers Associations and also are authorized physical persons.

Beekeepers' number of bee families and apiary average size. The 60 respondents were keeping a number of 4,044 bee families, meaning 67.4 bee families per apiary. Of the total number of bee families, 35.75 % are owned by the beekeepers from Calarasi County, 35.68 % are kept in Ialomitza County and 28-57 % in Prahova County. The highest average number of bee families was noticed in Calarasi and Ialomitza counties and it was almost equal to 72 bee families while in Prahova county the average apiary size was smaller, more exactly 57.25 bee families (Table 1).

Table 1. Distribution of bee families and average apiary size by beekeepers' county of origin

	CL	IL	PH	Total
No. of bee families	1,446	1,443	1,155	4,044
%	35.75	35.68	28.57	
No. of apiaries	20	20	20	60
%	33.3	33.3	33.4	100.00
No. of bee families per apiary	72.30	72.15	57.75	67.40

Beekeepers' distribution by apiary size pointed out that most of respondents, 54.98 %, own apiaries whose size varies between 50 and 100 bee families, 38.32 % respondents own apiaries smaller than 50 bee families and 6.70 % have more than 100 bee families (Table 2).

Distribution of bee families by apiary size varied between 0.49 % for the apiaries with 10-20 bee families and 27.77 % for the ones with 91-100 bee families. The highest share, 65.67 %, belonged to the apiaries with 50-100 bee families, 12.17 % for the ones keeping over 100 bee families and 22.16 % to the apiaries with less than 50 bee families (Table 3).

Apiaries' distribution by honey yield reflected that most of the apiaries, more exactly 61.66 %, produced less than 25 kg honey per bee family, 21.67 % apiaries achieved 26-40 kg honey per bee family and 16.67 % apiaries produced over 40 kg honey/ bee family (Table 4).

Table 2. Distribution of beekeepers by apiary size

	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. of beekeepers	1	2	6	14	3	10	6	7	7	4	60
%	1.66	3.33	10.00	23.33	5.00	16.66	10.00	11.66	11.66	6.70	100.00

Table 3. Distribution of bee families by apiary size

	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. of beekeepers	20	55	228	594	177	677	465	619	719	490	40.44
%	0.49	1.36	5.63	14.68	4.37	16.74	11.49	15.30	17.77	12.17	100.00

Table 4. Distribution of apiaries by honey yield

	Less than 10 kg	11-15 kg	16-20 kg	21-25 kg	26-30 kg	31-35 kg	36-40 kg	Over 40 kg	Total
No. of apiaries	9	9	12	7	8	4	1	10	60
%	15	15	20	11.66	13.33	6.67	1.67	16.67	100.00

Extracted honey production by apiary size.

The highest honey production, 66.53 % was achieved in the apiaries where 51-100 bee families were kept, 19.35 % production was

carried out in the apiaries with less than 50 bee families and 14.12 % in the largest apiaries where over 100 bee families were kept (Table 5).

Table 5. Extracted honey production by apiary size

	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
Extracted honey kg	200	1.200	4.515	14.442	5.730	17.210	11.860	15.845	19.359	14.800	105.161
%	0.19	1.14	4.29	13.73	5.44	16.36	11.27	15.06	18.40	14.12	100.00

Distribution of extracted honey by honey yield.

A large variation from 4.89 % in the apiaries where average honey production per bee family was less than 10 kg and 37.03 % in the apiaries where more than 40 kg honey per bee family was noticed. The highest honey production was carried out in the apiaries where the number of bee families varied between 50 and 100 (Table 6).

Honey yield varied between 9.71 kg per bee family for the apiary category less than 10 kg and 48.58 kg per bee family for the apiary category over 40 kg. Average honey production for all the 4,044 bee families kept by the 60 interviewed beekeepers accounted for 26 kg per bee family in 2011. This is a small production performance compared to other countries

reflecting important problems regarding pickings and bee family maintenance (Table 7).

Honey yield distribution depending on apiary size. In this respect, it was noticed an increasing honey yield in the larger apiaries. This indicator varied between 10 kg per bee family and 32.37 kg honey per bee family in the apiaries with 51-60 bee families and 30.20 kg honey per bee family in the largest apiaries (over 100 bee families) (Table 8).

Marketed honey was equal to obtained honey and accounted for 105,161 kg. Honey was sold in bulk to Beekeepers Local Associations and also in jars or cans to the direct clients. Honey quality was characteristic for conventional honey, just two beekeepers (3.34 %) obtained and sold organic honey having certified apiaries.

Table 6. Distribution of extracted honey by honey yield

	Less than 10 kg	11-15 kg	16-20 kg	21-25 kg	26-30 kg	31-35 kg	36-40 kg	Over 40 kg
Extracted honey (kg)	5.150	7.170	17.480	11.775	11.067	9.415	4.200	38.904
%	4.89	6.81	16.62	11.19	10.52	8.95	3.99	37.03

Table 7. Honey yield by apiary category depending on honey yield

	Less 10 kg	11-15 kg	16-20 kg	21-25 kg	26-30 kg	31-35 kg	36-40 kg	Over 40 kg	Total
Honey yield (kg/bee family)	9.71	12.96	19.20	24.37	28.82	33.98	40.00	48.58	26.00

Table 8. Honey yield by apiary size

	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
Honey yield kg/bee family	10	21.81	19.80	24.31	32.37	25.42	25.50	25.59	26.92	30.20	26.00

Average honey price varied between Lei 8.30/kg to Beekeepers' Association and Lei 16 lei/kg to direct clients. The lowest honey price, Lei 7/kg, was registered in Calarasi County and the highest one, Lei 22/kg, was noticed in Ialomitza County. Honey price varied according to honey type between Lei 13/kg for acacia honey and Lei 7.66 /kg for rape honey (Table 9).

Table 9. Honey price by honey sort (Lei/kg)

Acacia	Linden	Rape	Sun flower	Poliflora
13.00	10.00	7.66	9.70	9.50

Beekeepers' structure depending on the other apicultural products delivered on the market. From this point of view, 96.68 % respondents produced and sold wax, in general for exchange with combs, 20 % commercialized pollen, 18.33 % propolis and 10 % bee families (Table 10).

Table 10. Beekeepers' structure according to other apicultural products sold on the market

	Pollen	Propolis	Wax	Bee families	Total
No of beekeepers	12	11	58	60	60
%	20.00	18.33	96.68	100.00	100.00

Income from marketed honey for the 60 interviewed beekeepers accounted for Lei 1,208,566 in 2011, of which 23.36 % was carried out in Calarasi County, 39.52 % in

Ialomitza County and the remaining 37.22 % in Prahova County.

Average income per beekeeper was Lei 20,142.76 at sample level and by county the situation was the following one: Lei 14,061.50 in Calarasi County, the lowest income, Lei 23,883.40 lei in Ialomitza County, the highest income per beekeeper and Lei 22,483.40 in Prahova County. Over 77 % income was due to marketed honey at the best price to direct clients (Table 11).

Table 11. Distribution of income from sold honey by county

	CL	IL	PH	Total
Income-Lei	281,230	477,668	449,668	1,208,566
%	23.26	39.52	37.22	100.00

Beekeepers' distribution by income from marketed honey. About 65 % interviewed beekeepers achieved less Lei 20,000 income in 2011, as follows: 33.33 % earned between Lei 10,001-20,000 and 31.66 % less than Lei 10,000 lei. About 3.35 % beekeepers earned over Lei 50,000 income. It was expected as the highest income to be earned by the beekeepers whose apiaries recorded the highest honey production, but the average sale price advantaged the ones who registered a smaller production. This aspect reflects that there are problems with honey marketing. Beekeepers who achieve higher honey production have difficulties to deliver it at a higher price (Table 12).

Table 12. Beekeepers' structure by income from marketed honey (Lei/year)

	Less than Lei 10,000	Lei 10,001-20,000	Lei 20,001-30,000	Lei 31,000-40,000	Lei 40,001-50,000	Over Lei 50,000	Total
No. of beekeepers	19	20	6	8	5	2	60
%	31.66	33.33	10.00	13.33	8.33	3.35	100.00
Income-Lei	128,576	283,770	138,400	280,720	222,000	155,100	1,208,566
%	10.63	23.47	11.48	23.22	18.36	12.84	100.00

Beekeepers' income by apiary size. In general, it was noticed an increased income in the larger apiaries. So, the respondents who kept 91-100 bee families earned Lei 348,340 from marketed honey, the highest income

representing 20.54 % of total income at sample level, Lei 1,208,566. Also, an important income accounting for Lei 242,915 was achieved by the beekeepers who kept 61-70 bee families (Table 13).

Table 13. Beekeepers' income by apiary size

	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. of beekeepers	1	2	6	14	3	10	6	7	7	4	60
%	1.66	3.33	10.00	23.33	5.00	16.66	10.00	11.66	11.66	6.70	100.00
Income-Lei	1,825	13,028	48,023	160,990	62,460	242,915	122,800	157,995	248,340	150,150	1,208,566
%	0.15	1.07	3.97	13.32	5.16	20.09	10.16	13.07	20.54	12.47	100.00

Average income per beekeeper, bee family and kg honey. Income per bee family was in average Lei 298.85 in 2011, ranking between Lei 194.48 in Calarasi County and Lei 389.32 in Prahova County. In average per honey kilogram, an apiculturist obtained Lei 11.49 at sample level, with variations between Lei 10.80/kg in Ialomitza County and Lei 12.23/kg in Prahova County.

At sample level, an apiculturist earned in average Lei 20,142.76 in 2011, the highest income being recorded in Ialomitza County and the lowest one in Calarasi County. Income level depended directly on marketed honey and sale price.

Beekeepers' structure according to the means used to promote honey and other bee products. All the interviewed beekeepers mentioned that they are accustomed to promote honey and other bee products in the moment of sale during the dialogue run with each client.

About 30 % respondents took part to various honey fairs, 26.66 % are accustomed to label their products and on the label they write information about their apiary, honey sorts, contact address; 25 % beekeepers answered that they were recommended by their clients to other clients, 11.66 % proceed to make advertising but this is very costing, 8.33 % are accustomed to give a visiting card to their clients, and 5 % beekeepers have a web page with all the needed information for any client (Table 15).

Inputs bought by beekeepers in 2011. Business development or maintenance involves some expenditures as shown in Table 16. Most of the beekeepers bought combs and frames, usually at exchange with wax, also feeders, bee hives and bee families, biostimulators, medicines for treatment of bee diseases, honey extractor and other specific inventory for an apiary.

Table 14. Average income per beekeeper, bee family and kg honey by county

	Income per bee family (Lei/Bee family)	Income per kg honey (Lei/kg)	Income per beekeeper (Lei/beekeeper)
CL	194.48	11.63	14,061.50
IL	331.02	10.80	23,883.40
PH	389.32	12.23	22,483.40
Total sample	298.85	11.49	20,147.76

Table 15. Distribution of beekeepers by promotion form of their bee products

	Orally at the sale place	Announcements	Web page on internet	Visiting card	From a client to another	Label on each product	Participation at fairs	Sheets	Total
No. of beekeepers	60	7	3	5	15	16	18	9	60
%	100.00	11.66	5.00	8.33	25.00	26.66	30.00	15.00	100.00

Table 16. Distribution of beekeepers by input bought in 2011

Input	No. of beekeepers	%	Input	No. of beekeepers	%
Frames and combs	58	96.66	Polen collector	4	6.66
Feeders	18	30.00	Carpenter for bee hives making	4	6.66
Bee hives	15	25.00	Bee smoker	3	5.00
Bee families	15	25.00	Beekeeper suit	3	5.00
Medicins	5	8.33	Selected bee queens	3	5.00
Tray for honey extraction	4	6.66	Sugar	2	3.33
Fork	4	6.66	Auto small trailer	2	3.33
Wire	4	6.66	Total	60	100.00

Major problems beekeepers are facing are the following ones: low honey purchasing price, expensive fuels, high tariff for rent a mean of conveyance in pastoral, high price for apiary inputs, crop spraying, bee diseases, low subsidy, self polynating crop hybrids which do not allow bees to collect nectar, climate variations with a negative impact on pickings (Table 17).

Beekeepers' financial resources are mainly represented by their own resources but also by subsidy received from Government and E.U. per bee family under the condition to be a member of Beekeepers Association and deliver a specific amount of honey to an authorized processor.

Beekeepers' opinion on the ways for increasing honey production. Most of the interviewed beekeepers considered that the increase of the number of bee families is the most important way to growth honey production. Also, on the 2nd position they consider that a corresponding feeding for bee families is very important for strengthen their power and enable them to collect more nectar and fill combs with honey.

Table 17. Distribution of beekeepers according to the major problems they are facing

Problem	No. of beekeepers	%
Low honey purchase price	21	35.00
Expensive Diesel	8	13.33
High tariff/km at rent of a mean of transportation	8	13.33
High input price	8	13.33
Crop spraying	7	11.66
Bee diseases	7	11.66
Low subsidy	6	10.00
Self polynating hibrids for sun flower crop	6	10.00
Climate variation with a negative impact on pickings	5	8.33
Low quality medicines	3	5.00
Lack of transportation means	2	3.33
Steelers in pastoral	1	1.66
Bureaucracy	1	1.66
Total	60	100.00

Bee hives transportation in pastoral and the use of biostimulators as well as treatments in case of disease are also extremely important for increasing honey production. The use of selected bee queens should not be neglected too because they contribute to the development of the bee family (Table 18).

Table 18. Distribution of beekeepers according to their opinion on the ways how to increase honey production

	Increased number of bee families	Use of selected bee queens	Maintenance of bee family	Application of treatments in case of diseases	Better pickings	Use of biostimulators	Additional feeding	Total
No. of beekeepers	16	5	58	48	28	13	26	60
%	26.66	8.33	96.66	80.00	46.66	21.66	43.33	100.00

Beekeepers' opinion regarding the modalities to obtain a higher price at honey deliver was the following one:

about 30 % interviewed beekeepers opinated that production diversification based on a better use of acacia, linden, sun lower, rape etc pickings; 40 % interviewees answered that they have to incorporate more value added into sold product in order to sell it at a higher price; for example, they use to add nuts, almonds, sea buckthorn, comb parts, polen etc; 65 % respondents considered that more honey has to be sold to direct clients and a minim amount of honey to be delivered to beekeepers association or processors or intermediaries; 13.33 % beekeepers proposed to sell honey abroad because on the EU market honey price is higher than on the domestic market, but there is a huge bureaucracy and high taxes to get the export authorization; 6.66 % considered that organic honey could bring a better price by 20-30 % higher than the actual one for conventional honey; other 6.66 % respondents considered that they need to improve their negotiation abilities in order to get a higher price from beekeepers' association and intermediaries; 13.33 % considered that honey price should be differentiated from client to client; 25 % respondents considered that embattled honey could bring an additional price compared to honey delivered in bulk; 6.66 % considered that they need to establish their own brand as a recognition and guarantee of product quality; 13.33 % respondents considered that subsidies are not enough to cover the increased input price; 13.33 % considered that beekeepers association has to be more involved in protecting its members' interests; 10 % respondents proposed the reduction of honey import from China which has a smaller price and lower quality, the dumping price being more attractive for consumers compared to Romanian honey which is more expensive; 6.66 % considered that honey price could increase if advertising regarding honey nutritional value and importance for human consumption would be intensified and consumer will be more conscious of its importance in his diet.

Finally, 86.66 % interviewed beekeepers considered that beekeeping is a profitable

activity and would like to continue this business increasing the number of bee families and supporting them to produce more honey.

CONCLUSIONS

Beekeeping is a profitable business in all the three counties taken into consideration. The average apiary size in the South part of Romania is 67.4 bee families with variations between 72 bee families in Calarasi and Ialomitza counties and 54 bee families in Prahova county.

About 55 % beekeepers own between 50 and 100 bee families, 38 % less than 50 bee families and the remaining 7 % over 100 bee families. However, apiary size is smaller than in other countries.

The honey produced by the all 4,044 bee families accounted for 105,161 kg, meaning 26 kg in average per bee family, with variations between 9.78 kg/bee family and 48.58 kg/bee family. Honey production could be increased extensively by growing the number of bee families per apiary.

Extracted honey is mainly commercialized in bulk to beekeepers association but also in cans and jars to direct clients.

Honey sale price varied between Lei 7 lei/kg in Calarasi County and Lei 22 in Ialomitza, in average accounted for Lei 11.49/kg, very low compared to honey price in the Western EU countries.

The 60 interviewed beekeepers earned Lei 1,208,566 income from marketed honey in 2011, of which 23.26 % was achieved in Calarasi county, 39.52 % in Ialomitza county and 37.22 % in Prahova county. Average income per beekeeper accounted for Lei 20,142.76, meaming Lei 11.49 per honey kg and Lei 298.85 per bee family. Therefore, income is deeply influenced by honey production and market price.

The major problems in beekeepings are related to low honey sale price, expensive fuels, high tariff for transportation in pastoral, input high price, self polynating crop hybrids and crop spraying, bee diseases, low subsidy and climate change.

To increase economic efficiency in beekeeping, apiculturists have to be focused on the growth of apiary size, production diversification and integration, honey quality, and export intensification on the EU market where demand is continuously increasing.

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