A research on determination of the technical and structural characteristics of beekeeping in Konya province

Durmuşali Ceylan[1*], Nuray Şahinler[2]

[1]*Çumra High Vocational School, Selçuk University, 42500, Çumra, Konya-Turkey*
[2]*Department of Animal Science, Faculty of Agriculture and Natıure Sciences, Uşak University, 64000, Uşak-Turkey*

_____

Abstract

In this study, the structural situations of beekeeping were investigated by surveying to migratory and stationary 320 beekeepers (200 stationary + 120 migratory) that have15 698 hives in 10 district and 68 villages of Konya in Turkey. At the end of study, it was determined in average that the age of beekeepers involved in survey was 46.18 years, their experience in beekeeping was 14.40 years, the number of the old type hive was 3.75 per beekeeper. It was determined that migratory beekeepers were professional ones who see beekeeping as the main job and major income provider. The migratory beekeepers were more educated careful and experienced than stationary beekeepers in usage of high quality queen bee. All beekeepers' applications of spring feeding in their colonies were also determined.

Keywords: Beekeeping, beekeeping applications, gender, age, education
_____

1. Introduction

Various flower honeys are produced in all regions [1,2]. Turkey's share in the total assets in the world of total bee assets, share of the total honey production and is 6.98%, 4.76% share of the total honey production, and wax share of the total wax production were 6.98%, 4.76% and 5.61%, respectively [3].Turkey has a strong potential in the development of beekeeping, increase of bee products and colonial presence at the several ecological conditions. Turkey has considerable potential in beekeeping with her rich flora, proper ecological conditions and existence of colony. However Turkish beekeeping sector has not utilized the rich natural resources sufficiently. Turkey is one of the most important honey producer countries. In Turkey, 200.000 agricultural organizations have activities in apiculture.

But, only 20.000 of these organizations deal with apiculture as their main source of income. Today, 56 million bee hives exists in the world and 1.2 million tons of honey is produced from these hives. ¼ of produced honey is subject to trade and %90 of the exports come from nearly 20 honey producing countries [4]. Yılmaz [5] reported that 6.3% of beekeepers is dealing with beekeeping, and 93.7% of beekepers are dealing with other businesses with beekeeping in Edirne in Turkey. Oğuz and Direk [6] reported that they had been done in Konya, beekeeping experiences in beekeeping businesses was determined as 11.30 years. The aim of current study was to establish the structural situations of beekeeping in 10 district and 68 villages of Konya in Turkey.

_____

Corresponding author: *e-mail: daliceylan@hotmail.com*

2.Material and Methods

2.1. Material

The material of study was constituted 320 apiarist, 200 of fixed and 120 of migratory beekeeping, 15 698 of colony of bees (1 203 of primitive hive and 14 495 of modern hive) and survey forms which were answered by apiarist. The related literature, competent person and institutions were used as auxiliary material.

2.2. Method

2.2.1. The method of data acquisition. According to the statistics of 2001 in Konya, distributions of 69 559 colonies were evaluated with regard to the districts (Table 1). 10 districts where intensely made beekeeping and included the 50% of total colony number were determined according to experimental design depending on whole chance. These districts determined (Karatay, Meram, Selçuklu, Beyşehir, Bozkır, Çumra, Derebucak, Doğanhisar, Hadim, Taşkent) constituted 68.83% of colony number in Konya. These places were determined working together with provincial directorate of agriculture and 68 of village (15%) were also determined depending on chance. The number of village taken to the scope of the survey constituted 15% of village raised bee in Konya. The survey was applied to beekeepers had more than 10 hives.

2.2.2. Survey. Questionnaire form which was prepared mutual for fixed and migratory beekeeping in order to obtain the data of survey was used. The survey had 5 main topics. It was mentioned the private information related to beekeeper and firm in section one; the informations about identification and treatment of disease and pests in second section; the informationd about spring care and nutrition in third section;the informations about harvest, autumn care, nutrition and winterization in fourth section and also the information about credit relations of beekeepers in fifth section.

2.2.3. Data collection. The survey with fixed and migratory beekeeping was carried out in 01.11.2002-31.03.2003. The questionnaire forms were filled with mutual conversation by visiting the beekeepers.

2.2.4. Assessment of data. Assessment of datas obtained from survey with total 320 beekeeper (120 of migratory and 200 of fixed) was used proportional distribution. Total datas were summarized in rxc table and X^2 (chi-square) was used for independence test related to these. Dates correction was adjusted when the frequency of datas was lower than 5. Equation is below:

$$X^2 = \frac{\Sigma(\left| G_i - B_i \right| - 0.5)^2}{B_i}$$

G_i = Monitored frequency

B_i = Expected frequency [7].

2.3. Statistical analysis

Statistical analysis of the data obtained in this study was made according to "Duncan Multiple Comparison Test" [8].

3.Results and Discussion

The mean values, belonging to beekeepers and beekeeping business and obtained from study are given Table 1. Main topic contained the information about beekeeper and beekeeping business, the average of primitive hive of beekeepers was 3.75. The average of modern hive was 45.30. Also, it was determined that 61% of these hives was Langstroth type. 59% of beekeepers was used crossbreed bee. 49% of beekeepers did not follow recent developments. 59% of beekeepers was naturally produced the queen. Almost all beekeepers (99.69%) was male, average of age was 46.18, experiences of beekeeping were 14.40 year and also 62% of beekeepers prefered the beekeeping to provide the income bracket.

There was not any female beekeeper in migratory beekeepers, while only one female was found in fixed beekeepers (Table 2). It was determined that 99.69% of beekeepers was male and 0.31% of beekeepers was female when all beekeepers were evaluated.

Table 1. The mean values belonging to beekeepers and beekeeping business

Questions	Migratory beekeepers $\overline{X} \pm s\overline{x}$	Fixed beekeepers $\overline{X} \pm s\overline{x}$	All beekeepers $\overline{X} \pm s\overline{x}$	Total
Age of beekeepers (year)	44.80 ± 1.01	47.01 ± 0.83	46.18 ± 0.64	-----
Experiences of beekeeping (year)	16.27 ± 1.03	13.28 ± 0.74	14.40 ± 0.60	-----
Number of primitive hive (colony/beekeeper)	3.30 ± 0.92	4.03 ± 0.68	3.75 ± 0.55	1 203 numbers
Number of modern hive (colony/beekeeper)	81.92 ± 6.05	23.33 ± 1.09	45.30 ± 2.85	14 495 numbers
Honey production (kg/colony)	25.58 ± 1.14	18.39 ± 0.57	21.08 ± 0.58	330 977 kg

	Migratory beekeepers	Fixed beekeepers	All beekeepers
Recognition of disease and pests	95.83% recognized / 4.17% unrecognized	76% recognized / 24% unrecognized	83.44% recognized / 16.56% unrecognized
Use of licensed drug	90.83% attentive / 9.17% inattentive	68.5% attentive / 31.5% inattentive	76.88% attentive / 23.12% inattentive
Nutrition of colonies	100% committed	100% committed	100% committed
Instrumental insemination	74.17% receiving / 25.83% not receiving	33.50% receiving / 66.50% not receiving	48.75% receiving / 51.25% not receiving
Marketing of honeys	19.17% comb honey / 10.83% cenrifugal honey / 70% mixed	58.5% comb honey / --- cenrifugal honey / 41.5% mixed	43.75% comb honey / 4.06% cenrifugal honey / 52.19% mixed
Problem of marketing	56.67% existence / 43.33% non-existence	41% existence / 59% non-existence	46.88% existence / 53.12% non-existence
Control of queen in autumn	95% committed / 5% unexecuted	78.50% committed / 21.50% unexecuted	84.69% committed / 15.31% unexecuted
Winterization of bees	4.17% inside / 86.67% outside / 9.17% in cantilever	2% inside / 65% outside / 33% in cantilever	2.81% inside / 73.13% outside / 24.06% in cantilever
Credit usage	85.83% desired / 14.17% undesired	61.50% desired / 38.50% undesired	70.62% desired / 29.38% undesired

Table 2. Gender of beekeeper

Gender of beekeepers	Migratory beekeepers		Fixed beekeepers		All beekeepers	
	Number	%	Number	%	Number	%
Male	120	100.00	199	99.5	319	99.69
Female	-	-	1	0.5	1	0.31
Total	120	100.00	200	100.00	320	100.00

Table 3. Age distribution of beekeepers

Age of beekeepers	Migratory beekeepers		Fixed beekeepers		All beekeepers	
	Number	%	Number	%	Number	%
15-20	1	0.83	-	-	1	0.31
21-30	8	6.67	17	8.50	25	7.81
31-40	34	28.33	47	23.50	81	25.31
41-50	34	28.33	47	23.50	81	25.31
50 <	43	35.83	89	44.50	132	41.25
Total	120	100.00	200	100.00	320	100.00
$\overline{X} \pm S\overline{x}$ (year)	44.80±1.01*		47.01±0.83		46.18±0.64	

*mean±standard deviation

Table 4. Educational background of beekeepers

Education of beekeepers	Migratory beekeepers		Fixed beekeepers		All beekeepers	
	Number	%	Number	%	Number	%
Literate	2	1.67	10	5.00	12	3.75
Primary school	62	51.67	98	49.00	160	50.00
Secondary school	19	15.83	31	15.50	50	15.63
High school	19	15.83	30	15.00	49	15.31
University	18	15.00	31	15.50	49	15.31
Total	120	100.00	200	100.00	320	100.00

Age of beekeeper can be seen as a significant factor to determine the socio-economic situation of beekeepers due to be an activity done in mountains, highlands, forests, tents and sheds for especially migratory beekeeping. It was expected that more young beekeepers engaged in beekeeping because migratory beekeeping was more tiring than fixed beekeeping. According to results of survey, the rate of median age (30-50) beekeepers was 56.66% in migratory beekeepers;

47% in fixed beekeepers. The rate of over 50 years of age beekeepers was 35.83% in migratory beekeepers; 44.50% in fixed beekeepers. The age of beekeepers are shown in Table 3. Although 0.83% of migratory beekeepers was in between 15-20 age, there was not fixed beekeepers in this age range. The rate of over 31-40 years of age beekeepers was 28.33% for migratory beekeepers; 23.50% for fixed beekeepers. It was determined that the average of age was 44.80 for migratory beekeepers; 47.01 for fixed beekeepers

and 46.18 for all beekeepers. Concerning result of chi-square test, the difference between migratory beekeepers and fixed beekeepers was found statistically insignificant (P> 0.05) in terms of the age of beekeepers. In the study of Erkan [9] in Bahçesaray district of Van, the rate of over 50 years of age beekeepers was 13.35% in migratory beekeepers; 24.71% in fixed beekeepers. Oğuz and Direk [6] reported that they had been done in Konya, beekeeping experiences in beekeeping businesses was determined as 11.30 years.

Educational background of beekeepers was an important factor to determine the socio-economic situation of beekeepers and make beekeeping consciously. For this reason, results are given in Table 4. According to results of investigation, there was not illiterate beekeeper, the rates of literacy, primary school education, secondary school education, high school education and university education in migratory beekeepers were 1.67%, 51.57%, 15.83%, 15.83% and 15%, respectively. In fixed beekeepers, the rates of literacy, primary school education, secondary school education, high school education and university education were also determined as 5%, 49%, 15.50%, 15% and 15.50%, respectively. Concerning result of chi-square test, the difference between migratory beekeepers and fixed beekeepers was found statistically insignificant (P> 0.05) in terms of the age of beekeepers.

Şahinler and Şahinler [10] found that 82% of beekeepers was primary school graduate; 13% was secondary school graduate; 4% was high-school graduate. In the investigation of Erkan [9] in Bahçesaray district of Van, there was no illiteracy in migratory beekeepers and 40% of migratory beekeepers was literate. In fixed beekeepers, the rates of illiteracy and literate were 23.53% and 30.59%, respectively. Additionally, the rate of high school and university education in all beekeepers was also informed as 8%

In this study, the rate of primary school graduate beekeepers (50%) was lower than Şahinler and Şahinler [10]. Besides, the rates of secondary school (30.94%) and university graduate (15.31%) beekeepers were higher than the sstudies of both Şahinler and Şahinler [10] and Erkan [9]. The differences of education of beekeepers can be

originated from local differences or the development of the educational level of beekeepers after the investigation in 1996 and 1998.

Conclusion

At the end of study, it was determined in average that the age of beekeepers involved in survey was 46.18 years, their experience in beekeeping was 14.40 years, the number of the old type hive was 3.75 per beekeeper. It was determined that migratory beekeepers were professional ones who see beekeeping as the main job and major income provider. In fixed beekeepers, the rates of illiteracy and literate were 23.53% and 30.59%, respectively. Additionally, the rate of high school and university education in all beekeepers was also informed as 8%.

Compliance with Ethics Requirements. Authors declare that they respect the journal's ethics requirements. Authors declare that they have no conflict of interest and all procedures involving human / or animal subjects (if exist) respect the specific regulation and standards.

References

1. Özcan, M., Arslan, D., Ceylan, D.A., Effect of inverted saccharose on some properties of honey. *Food Chem.* **2006**, *99*, 24-29.
2. Özcan, M.M. and Ölmez, Ç., Some qualitative properties of different monofloral honeys. *Food Chem.* **2014,** *163*,212–218.
3. Anonymous, Arıcılık İstatistikleri. Tarım ve Köyişleri Bakanlığı İl Müdürlüğü Proje İstatistik Şubesi, Konya,2002.
4. Vural, H., Karaman, S., Socio-Economic Analysis of Beekeeping and the Effects of Beehive Types on Honey Production. *Not. Bot. Hort. Agrobot. Cluj* **2009**, *37*, 223-227.
5. Yılmaz, H., Edirne Bölgesi Arıcılığı, Sorunları ve Çözüm Yolları Üzerine Araştırmalar Yüksek Lisans Tezi. Trakya Üniversitesi Fen Bilimleri Enstitüsü, Edirne,1999.
6. Oguz, C., Direk, M., Konya İlinde Arıcılık İşletmelerinin Ekonomik Yapısı, İşleyişi, Sorunları ve Çözüm Yolları Üzerine Bir Araştırma. Türkiye III. Arıcılık Kongresi, Adana, 2000.
7. Everitt, B.S., *The Analysis Of Contingency Table*. Published by Chapman and Hall, p:164, 1992, London

8. Püskülcü, H., Ikiz,F., *Introdiction to statistic*. p333. Bilgehan Presss: Bornova, Izmir, Turkey (in Turkish), 1989.

9. Erkan, C., Van İli Bahçesaray İlçesi Arıcılık Faaliyetleri ve Sorunları Üzerine Araştırmalar. Yüksek Lisans Tezi, Yüzüncü Yıl Üniversitesi Fen Bilimleri Enstitüsü, 1988, Van, Turkey

10. Şahinler, N., Şahinler, S., 1996. Hatay İlindeki Arıcılığın Genel Durumu, Sorunları ve Çözüm Yolları. M.K.Ü. Ziraat Fakültesi Dergisi, Hatay, Turkey, 1996