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Original Research Article

Distinctive Features of the Seep Farmer, Management Practices of Feeding and Breeding, and Products of Sheep Farms in Bursa Province (Turkey)

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ABSTRACT

The objective of this study was to examine the structural status and the breeding characteristics of sheep farms that stand out in the city of Bursa with regard to their agricultural production activities. The farms were divided i93nto three groups: small-size farms (50 to 100 head), medium-size farms (101 to 150 head) and large-size farms (above 151 head). Sheep farms in Bursa are carried out in a settled style, and this agricultural activity is the main income source of breeders. The main reasons for the changes in the sheep population are economic problems and the difficulty of finding shepherds. Various problems that have come about due to the problematic use of pastures, which are indispensable for sheep breeding, now create significant limitations for sheep breeding. On the other hand, the geographical structure and the land size of Bursa Province, in addition to its proximity to metropolitan cities and markets, present important opportunities for the development of sheep breeding. At this point, it is important that the establishments included in the study put into effect the already existing dynamics to be more active for increasing profitability and productivity.

Keywords: Sheep housing, Herd management, Pasture management, Structural characteristics, Reproduction management

INTRODUCTION

Animal husbandry is important in Turkey, as well as worldwide, for providing sufficient and balanced nutrition for the increasing population (Karagöz, 2009). When the geographical structure and pasture fields of Turkey are considered in terms of animal husbandry, it should not be overlooked that sheep breeding can be carried out at a minimum cost (Koyuncu, 2012). It is important to increase efficiency per animal in sheep breeding practices to support the development of Turkey. To increase efficiencies per animal, feeding and genetic advancements should be made while improving the living conditions of the sheep to an optimum level (Kocaman and Yüksel, 2001).

Since sheep breeding in Turkey is mostly carried out on small-size farms and is dependent on pastures, the animal products obtained are the fundamental nutrient sources of agricultural establishments (Kaymakçı and Sönmez, 1996). Therefore, it should not be expected that efficient and profitable production will be carried out all over Turkey by such an extensive type of breeding. In addition, sheep breeding should become more profitable and sustainable so that the income acquired by sheep breeding establishments from production will increase along with support given to the Turkish economy. In this case, it is important to accelerate the process of intensive breeding in regions where it is possible to speed breed, while ensuring that sustainable production is provided to other regions (Aydın and Dellal, 2001). The most important questions at this point are which production system will be used in which region and which reclamation method will be applied. To make such decisions, it is important to determine the structural and breeding properties of the already existing sheep farms in the region.

The emphasis in this study was to determine the fundamental problems of sheep farms in Bursa province in terms of the current structural status and breeding properties, as well as the actions that can be taken to improve this situation.

MATERIALS AND METHODS

Study area

The research material consisted of data obtained through survey and observation in the counties of Yenişehir, Gürsu, Kemalpaşa, Karacabey, Keles, Büyükorhan, İnegöl and Nilüfer, which incorporate 70% of the total sheep

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population of Bursa Province in Turkey. This province is located in the humid lowland tropics at an altitude of 100 m above sea level, at a longitude 29.04 °E and latitude 40.11 °N (average minimum temperature 10.39 °C, average maximum temperature 21.37 °C, annual rainfall 660.1 mm).

Data collection

The data were acquired via a survey consisting of questions that aim to discover the general characteristics of the sheep farm activities in the Bursa province, the structural characteristics of the sheep farms, the equipment of the sheep farms and the traditional sheep breeding methods. The survey was implemented on a face-to-face basis at relevant farms. Thus, it was possible to validate the consistency between the answers of breeders and the actual conditions at the sheep farms. This fact helped in testing the accuracy of the answers to survey questions.

Sample selection

The research area comprised farms with more than 50 head in 8 counties of Bursa Province; a main population of these farms was registered and 99 sample farms were determined for survey through simple random sampling. During the assessment of the survey results, the farms were classified in consideration of the number of sheep, as follows: small-size farms (50 to 100 head), medium-size farms (101 to 150 head), and large-size farms (more than 150 head).

Statistical analysis

Survey data were calculated as group averages and Fisher's generalized chi-square test were used for the comparisons made between the groups. The categorical variables obtained during the study were expressed with frequency and relevant percentage values. Nominal logistic regression analysis was carried out to determine the independent risk factors. The variables were determined to be significant as a result of the Chi-square significance test and were used as independent variables in the logistic regression analysis carried out to determine whether breeding applications and structural characteristics affect the size of the farm. The analyses of the study were carried out using the SPSS v.22 (SPSS, 2013) statistical package software and the level of significance was taken as α=0.05.

RESULTS AND DISCUSSION

Structural characteristics related with breeding

It was observed that the people who carry out sheep farm activities in the city of Bursa are middle aged or older (Table 1). The majority of young farmers in the families have migrated to cities, mostly due to economic and social reasons. Moreover, the young farmers who stay are unwilling to continue the sheep breeding activities that were traditionally accepted as an occupation that is passed down from father to son. The fact that the majority of the farmers included in the study are primary school graduates, which can be explained by the high age average of the breeders and the lack of interest of the young population in animal breeding activities. It was determined that the sheep farm farmers have an average experience of over 10 years. This implies that farmers tend to continue the only job they have known and have experience doing since they started sheep breeding while still a child. It was determined by many of the studies that were carried out on this topic that sheep breeding is conducted by breeders with an experience of at least 10 years (Şahin and Yıldırım, 2002; Şahin and Yılmaz, 2008; Alexandre *et al.*, 2009; Katanos *et al.* 2009; Acar and Ayhan, 2012).

Table 1. The characteristics of breeders and farms.

Characteristics	50-100 head	101-150 head	> 150 head	p-value	
Age of the breeder	**%**	**%**	**%**		
≤30	6.90	3.12	10.53	0.004	p_{12} =0,059 p_{13}=0,001 p_{23}=0,098
30-44	10.34	37.50	34.21		
45-60	55.17	46.88	55.26		
≥60	27.59	12.50	0.00		

Education	**%**	**%**	**%**		
Literature	3.45	0.00	2.63		
Primary School	89.65	78.12	76.31		
Secondary School	3.45	6.25	10.53	0.549	
High School	3.45	15.63	10.53		
Experience of sheep breeding (year)	**%**	**%**	**%**		
≤10	10.34	9.37	7.90		
10-20	24.14	31.25	21.05		
20-30	20.69	31.25	21.05	0.864	
30-40	20.69	12.50	23.68		
≥40	24.14	15.63	26.32		
Shepherd presence	**%**	**%**	**%**		
Yes	86.20	93.75	100.00	0.064	
No	13.80	6.25	0.00		
The period of Shepherd	**%**	**%**	**%**		
Seasonal	4.00	3.33	7.89	0.149	
Permanent	96.00	96.67	92.11		
Shepherd from family or salaried	**%**	**%**	**%**		
Family	80.00	76.67	44.74	0.005	p_{12} =0,766 p_{13}=0,005 p_{23}=0,008
Salaried	20.00	23.33	55.26		
Reason for sheep breeding	**%**	**%**	**%**		
Source of income	93.10	96.88	100.00	0.192	
Additional income	6.90	3.12	0.00		
Did the number of sheep increase in the past 5 years?	**%**	**%**	**%**		
Yes	65.52	87.50	81.58	0.096	
No	34.48	12.50	18.42		
Reasons for the increasing number of sheep	**%**	**%**	**%**		
Income	78.95	85.71	61.30		
Sufficient support	0.00	3.57	3.22	0.085	
Ease of credits	5.26	0.00	0.00		
Own preference	15.79	10.71	35.48		
Reasons why the number of sheep did not increase	**%**	**%**	**%**		
Lack of shepherd	40.00	0.00	28.57		
Decrease of income	40.00	75.00	42.85		
Insufficient government funds	0.00	25.00	14.29	0.534	
Decrease of income + Insufficient government funds	20.00	0.00	14.29		
Source of knowledge	**%**	**%**	**%**		
Family	48.28	43.75	68.42		
Newspapers-TV	0.00	9.38	7.90		
District Directorates	37.93	21.87	18.42	0.097	
Fairs	3.45	6.25	0.00		
Newspapers-TV+ District Directorates	10.34	18.75	5.26		
Membership of any organization	**%**	**%**	**%**		
Yes	82.76	100.00	100.00	0.002	p_{12} =0,020 p_{13}=0,012 p_{23}= -
No	17.24	0.00	0.00		
Membership of agricultural organizations	**%**	**%**	**%**		
Union	58.33	34.37	28.95		
Cooperative	4.17	0.00	0.00		
Chamber of Agriculture	8.33	6.25	5.26		p_{12} =0,024
All three	12.50	21.88	36.84	0.017	p_{13}=0,012
Union+Chamber of Agriculture	0.00	37.50	23.68		p_{23}=0,404
Union+Cooperative	8.33	0.00	5.26		
Cooperative+ Chamber of Agriculture	8.33	0.00	0.00		

Most of the farms use shepherds. Six farmers of small- and medium-size farms have stated that they do not employ any shepherds and that they work as shepherds themselves. Whereas shepherding activities are carried out mostly by family members on small- and medium-size farms, large-size farms employ shepherds since the increased number of animals requires more labor. The shepherds on all farms generally work permanently, and seasonal employment is very rare. Such demands occur during labor-intensive periods, such as birth, milking, etc.

Sheep breeding activities in Bursa province have been integrated with daily life and have a structure in which profitability is of secondary importance behind meeting the demands of the family. In general, sheep breeding is the only source of income for the families at the establishments included in the study. This result is in accordance with previous studies carried out by various researchers in which it the data showed that sheep breeding is the fundamental source of income and employment for the people of the region and that sheep breeding is carried out to provide for the family rather than for commercial enterprise (Dellal *et al.*, 2002; Aysan Dayan, 2007; Alexandre *et al.*, 2009; Durmuş, 2010; Karaman *et al.*, 2012). On the other hand, the result differs from the expression stating that sheep breeding is mostly carried out for seasonal income (Şişman *et al.*, 2009). The majority of the breeders included in the study indicated that the number of sheep increased during the past 5 years. The stated reason for the increase in the number of sheep for all farms is most commonly an increase in earned income. Whereas small- and medium-size farm owners state that animal breeding can results in increased profitability when the number of animals is increased, large-size farms indicated that efficiency per animal increases due to the an increased number of animals, which thus increases the profit margin. On the other hand, small-size farms owners indicated that the reason for the decrease in the number of sheep in the past 5 years was being unable to find the time to work as shepherds, because they needed to carry out agricultural activities as well. Meanwhile, medium-size farms indicated that the reason for the decrease in the number in sheep was due to the increase in prices of fodder in addition to the low milk, meat and wool prices. Large-size farms indicated that the reason for the decrease in the number in sheep was due to difficulties in finding shepherds. Similarly, it was proposed by Dellal *et al.* (2002), Öztürk (2011), and Aksoy and Yavuz (2012) that the number of animals has decreased in recent years due to the insufficiency of pastures and meadows, lack of profit, decrease in the number of individuals who work in this field and difficulties in finding shepherds to hire. At all the examined establishments, information related to sheep breeding is passed down from parents and continued on in the next generation of farmers, and this information is accepted as both sufficient and more reliable in comparison with other sources of knowledge. In this scope, there is a very small number of farm owners who state that they acquire information through the District Directorates of Agriculture as well as through fairs, newspapers, and TV. It was determined that all medium- and large-size farms, along with 82.76% of the small-size farms, were members of an agricultural organization. The consciousness to become a member of an agricultural organization increases as the size of the farm increases. Based on the data acquired, it was realized that sheep breeders are aware of the importance of agricultural organizations and that they give importance to this. It was observed that the ratio of farms that became members of the Union decreased with increasing farm capacity. On the other hand, it was observed that farms preferred to become members of all three agricultural organizations (Union, Chamber of Agriculture and Cooperative) as their capacities increased.

Characteristics of rangeland use and the forage plants and grains

It was determined that all farms included in the study benefited from the current rangeland areas in the region and that mostly public property rangeland is used as the source of rangeland. It was observed that the use of rangelands by the farms included in the study was not less than 5 months and that rangelands were used mostly for approximately 8 months (Table 2).

Table 2. Characteristics related with pasture.

Characteristics	50-100 head	101-150 head	> 150 head	p-value	
The same pasture is used always	**%**	**%**	**%**		
Yes	100.00	100.00	100.00		
No	0.00	0.00	0.00		
Pasture using duration (Months)	**%**	**%**	**%**		
5	13.79	3.13	5.26		
6	3.45	9.38	5.26		
7	0.00	0.00	10.53		
8	55.17	28.12	28.95	0.036	p_{12} =0,050
9	3.45	0.00	13.16		p_{13}=0,125
10	6.90	15.62	5.26		p_{23}=0,134
11	0.00	6.25	5.26		
12	17.24	37.50	26.32		
Daily grazing duration (Hours)	**%**	**%**	**%**		
5	6.90	3.13	7.89		
6	3.45	6.25	5.26		
7	0.00	3.13	7.89		
8	3.45	3.13	5.26	0.868	
10	6.90	12.50	5.26		
12	10.34	21.87	18.42		
12 hours in summer + 5 hours in winter	68.96	50.00	50.00		
Is the pasture sufficient?	**%**	**%**	**%**		
Yes	93.10	84.37	71.05	0.061	
No	6.90	15.63	28.95		
Reason why the pasture is not sufficient	**%**	**%**	**%**		
It was not used regularly in the past	50.00	100.00	54.55		
It was used for different purposes	50.00	0.00	9.09	0.189	
Insufficient care and irrigation	0.00	0.00	36.36		
Additional feeding presence	**%**	**%**	**%**		
Yes	93.10	96.87	86.84	0.296	
No	6.90	3.13	13.16		
Supplement feeding periods	**%**	**%**	**%**		
Insemination	0.00	3.23	0.00		
Pregnation	7.41	6.45	9.09		
Birth	37.04	35.48	18.20	0.115	
Milking	3.70	0.00	0.00		
Insemination+Pregnation	0.00	0.00	3.03		
Insemination+Birth	0.00	3.23	3.03		
Continuous	29.63	19.35	36.36		
Water source at the pasture	**%**	**%**	**%**		
Municipal water	13.79	6.25	28.95		p_{12} =0,411
Underground water	86.21	93.75	71.05	0.036	p_{13}=0,140
					p_{23}=0,015

The reasons for being able to use the rangeland for long periods of time, such as eight months, were determined as good weather and the short distance between the farms and the rangelands. The duration of grazing at the rangeland during the day for all farms was not less than 5 hours, both in winter and in summer, and it was observed that this duration could increase up to 12 hours. All farms included in the study benefited from the rangelands during the day, mostly as 12 hours during the summer +5 hours during the winter. The times for going out to and returning from the rangeland change according to the seasons, and the sheep go out at later times and return earlier in the winter. The sufficiency of the rangelands was evaluated by the breeders according to whether the rangeland is covered with plants. Breeders mostly think that the rangeland they use is sufficient for their sheep. On the other hand, it was stated that the rangelands become insufficient as the number of animals in the farm increases. This is an issue that worries the farms that want to increase the number of their animals. The fact that the ratio of additional grazing of the sheep in all farms exceeds 85% is different from the statements of Dellal *et al.*. (2002), Altıoğlu (2007), Aysan Dayan (2007) indicated that there is no need for flushing when

the sheep are in the rangeland. It can be stated that this difference is related to the current composition of the rangeland in the region. The fact that flushing is carried out mostly during the birth is an indication that sheep breeders are aware of feeding during this period. Similarly, whereas breeders in the Kırıkkale, Şanlıurfa and Adana provinces indicated that they carry out flushing during breeding or during birth (Bostancı, 2006; Altıoğlu, 2007; Özkan, 2008), breeders in the Çanakkale province stated that they do not carry out any flushing activities (Tölü *et al.*, 2007).

Farms generally make use of underground waters as a source of water for the rangelands in the districts. Since the rangelands used by large-size farms are closer to the villages, there is a greater use of municipal water. Even though the plants change according to the size of the sheep farms, the types of plants that are cultivated do not change, and mostly barley, wheat and corn are cultivated. These products are preferred, since they are annual forage and do not require high amounts of irrigation; however, clover, which is an important source of coarse fodder, cannot be cultivated sufficiently due to the demands for irrigation and labor.

Animal breeding applications

Breeding is carried out freely on all sheep farms, and there is no farm that carries out controlled breeding. Efforts to refrain from applications that require additional labor, especially for sheep breeding activities and ones that are carried out under extreme conditions, are also reflected in breeding applications. These efforts are in parallel with various different studies (Kaymakçı *et al.*, 1999; Dellal *et al.*, 2002; Altıoğlu, 2007; Aysan Dayan, 2007; Alexandre *et al.*, 2009; Alkan *et al.*, 2013). The examined sheep farms have different preferences with regard to breeding periods (Table 3).

Table 3. Management practices in farms.

Characteristics	50-100 head	101-150 head	> 150 head	p-value	
Breeding season	**%**	**%**	**%**		
March	0.00	6.25	5.26		
April	0.00	25.00	13.16		
May	0.00	9.37	10.53		
June	6.90	3.13	2.63	<0.001	p_{12} <0,001
July	3.45	21.87	7.90		p_{13}=0,024
August	17.24	15.62	5.26		p_{23}=0,105
September	0.00	0.00	5.26		
October	0.00	3.13	0.00		
Always in the stock	72.41	21.87	50.00		
Duration of the rams in the herd	**%**	**%**	**%**		
Always in the stock	72.41	15.62	50.00	<0.001	p_{12} <0,001
Throughout the breeding season	27.59	84.38	50.00		p_{13}=0,064
					p_{23}=0,003
Weaning age (Months)	**%**	**%**	**%**		
2	13.79	6.52	2.63		
4	72.41	84.37	86.84	0.551	
6	13.79	9.38	10.53		
Supplementary feeding for the lambs	**%**	**%**	**%**		
Yes	93.10	96.87	92.10	0.689	
No	6.90	3.13	7.90		
Supplementary feeding times	**%**	**%**	**%**		
15-20 days old	40.74	45.16	68.57	0.058	
30-40 days old	59.26	54.84	31.43		
The criteria for supplementary feeding of the lambs	**%**	**%**	**%**		
General appearance of the animal	17.24	21.87	23.68		
Pasture conditions	72.41	68.75	55.26	0.248	
Factory fodder	0.00	3.13	15.80		
Economic conditions	10.35	6.25	5.26		

Taking care of motherless lambs	**%**	**%**	**%**		
Hand feeding	82.76	71.88	71.05	0.669	
Other mothers	10.34	21.87	23.70		
Both	6.90	6.25	5.26		
Separation of the male and female lambs	**%**	**%**	**%**		
Yes	20.69	59.38	57.89	0.003	p_{12} =0,002 p_{13}=0,002 p_{23}=0,900
No	79.31	40.62	42.11		
Time of separation of the male and female lambs	**%**	**%**	**%**		
4 months old	66.66	89.47	72.73		
5 months old	16.67	5.26	9.09	0.492	
6 months old	16.67	5.26	18.18		
Mother milking status	**%**	**%**	**%**		
Yes	27.59	21.87	36.84		
No	72.41	78.13	63.16		
Milking duration	**%**	**%**	**%**		
2 months	62.50	42.86	50.00		
3 months	25.00	42.86	21.43		
4 months	12.50	14.28	14.29		
5 months	0.00	0.00	7.14		
6 months	0.00	0.00	7.14		
Fattening Program	**%**	**%**	**%**		
Yes	100.00	100.00	94.74	0.349	
No	0.00	0.00	5.26		
Fattening application method	**%**	**%**	**%**		
Lamb fattening	27.59	21.87	22.22	0.976	
Yearling	0.00	0.00	0.00		
Slaughter fattening	24.13	21.87	25.00		
Lamb fattening +slaughter fattening	48.28	56.26	52.78		
Type of fodder used in fattening	**%**	**%**	**%**		
Only fodder in the farm	0.00	3.13	0.00	0.685	
Only pasture	0.00	0.00	0.00		
Only factory fodder	3.45	0.00	2.78		
Pasture + farm sources	44.83	50.00	30.55		
Farm sources + Factory fodder	0.00	0.00	2.78		
Pasture + Factory fodder	20.69	15.62	27.78		
Combination of all three	31.03	31.25	36.11		
Age for first use as breeders	**%**	**%**	**%**		
<12 months old	24.14	3.13	21.05		
12 months old	51.72	68.75	63.16		
15 months old	17.24	21.87	10.53		
18 months old	6.90	6.25	5.26		

One of the most important reasons for holding the ram in the herd all year long is to accelerate the re-impregnation of the sheep after birth to cut down the additional labor for keeping the ram at a separate location. The data acquired for the duration of keeping the ram in the herd overlap with those of Çetin and Koyuncu (2000), Dellal *et al.* (2002), Özkan (2008), Bilginturan and Ayhan (2009). The fact that there is no standard breeding period application in the farms and keeping the ram in the herd all year long generally result in the spreading out of all births over the entire year. Similarly, there are various studies which indicate that, over a long period of time, birth takes place in different months of the year (Dellal *et al.*, 2002; Tölü *et al.*, 2007; Özkan, 2008).

The sheep on all examined farms are weaned generally when they are 4 months old (Table 3), which is similar to studies that indicate that sheep are weaned generally when they are 4 months old (Karaca *et al.*, 1996; Altıoğlu, 2007; Kılıç *et al.*, 2013), as although there are studies that indicate shorter weaning times (Kaymakçı *et al.*, 1999; Dellal *et al.*, 2002; Bostancı, 2006; Tölü *et al.*, 2007). Alexandre *et al.* (2009) indicate that weaning times of less than two months or greater than three months have negative effects on the nourishing performance of the lambs. The status of the rangeland is the most important and prominent criterion for determining the

nutritional program of the lambs in the establishments that carry out flushing activities. Breeders in all farms are sensitive with regard to taking care of the orphan lambs, and they either feed the lambs by hand or try to make them adjust to different mothers. Breeders that separate male and female lambs generally wean them when they are 4 months old, after which they sell all the male lambs and add the female lambs to the flock as breeders. Castration, tail cutting and dehorning applications are carried out on none of the farms included in this study. Milking is not carried out on the majority of the farms examined. The breeders state the reasons for this as the fact that the milk of the sheep is sufficient only for their lambs, that milking requires labor and time and that milk is cheap. The lambs at the farms where milking is carried out are milked after they are weaned, and they are milked mostly for a period of approximately 2–3 months. Milking is carried out by hand by the family members once per day before the sheep are taken to the rangeland in the morning. None of the farms has a separate milking location, and the person who takes the sheep for milking has to restrain the sheep throughout the milking process. Çetin and Koyuncu (2000), Bostancı (2006) have determined similar results for milking, whereas there are also studies that indicate that the suckling and milking operations are carried out simultaneously (Karaca *et al.*, 1996; Dellal *et al.*, 2002; Aysan Dayan, 2007; Özkan, 2008). The fattening application is carried out as directed to the sheep and sacrificial animals on the farms included in the study. Dellal *et al.*. (2002) and Özkan (2008) indicate that fattening applications are carried out primarily on sheep farms. The primary factors that affect this are the conditions of the region and market demand. Whereas wheat and barley are used as concentrate feed sources in small- and medium-size farms, in addition to the rangeland, large-size farms also use factory fodder in addition to the rangeland and the plants cultivated at the farm. Since a yield record is not kept at farms throughout the districts, subjective properties are given importance as selection criteria. The properties taken into consideration in the examined farms with regard to the selection of breeding stock are the general appearance of the animal and multiple births. There are studies that indicate that breeders benefit from the physical appearance of the animals as well as their experiences in selecting the animals to be used as breeding stock (Altıoğlu, 2007; Araç, 2007; Tölü *et al.*, 2007; Özkan, 2008). Similarly, Alexandre *et al.* (2009) put forth that the main criteria used by 90% of the breeders are the abilities of the animal to develop as well as to conform. On the other hand, the criteria of breeders for exclusion of animals from the breeding stock were determined primarily by the loss of teeth in the animals. However, Alexandre *et al.* (2009) determined in their studies that the exclusion criteria from breeding stock is general fertility problems. Females in the examined sheep breeding establishments are generally used as breeding stock once they are 12 months old. However, various researchers indicated that the age for use as breeding stock for the first time is before 12 months old or between 15 to 18 months (Tölü *et al.*, 2007; Kaymakçı *et al.*, 1999; Çetin and Koyuncu, 2000; Bostancı, 2006; Altıoğlu, 2007; Özkan, 2008; Gezer, 2010). The reason for the differences in the age for use as breeding stock for the first time is the difference of the sheep breeds used in the studies.

Evaluation of the products

Milk, fattening animals, wool and manure evaluations were considered within the concept of the evaluation of the products obtained at the farms (Table 4).

Table 4. Assessment of products.

Characteristics	50-100 head	101-150 head	> 150 head	p-value
Sheep milk	**%**	**%**	**%**	
Use in the farm	50.00	14.29	21.43	0.601
Selling to the dairy	50.00	71.43	57.14	
Use in the farm+Selling to the dairy	0.00	0.00	14.29	
Use in the farm+making cheese	0.00	14.28	7.14	
Culling animals	**%**	**%**	**%**	
Selling in the market	41.38	40.63	25.00	0.629
aSelling to the butchery	34.48	21.87	33.33	
Selling to the customer	6.90	12.50	25.00	
Butchery+Customer sales	17.24	25.00	16.67	

Wool	**%**	**%**	**%**		
Exchanging for the shearing cost	6.90	6.25	23.68		
Selling	37.93	68.75	71.05		p_{12} =0,046
Use in the farm	37.93	18.75	2.63	<0.001	p_{13}<0,001
Selling+Use in the farm	0.00	3.12	0.00		p_{23}=0,028
Throwing to the garbage	17.24	3.12	2.63		
Manure	**%**	**%**	**%**		
Use in the farm	93.10	96.87	71.05		p_{12} =0,600
Selling	6.90	3.13	28.95	0.004	p_{13}=0,024 p_{23}=0,004

Milk is used for family consumption purposes as yogurt, cheese or butter in 50% of the small-size farms examined, whereas in the other 50% of small-size farms, it is directly sold to dairies, while medium- and large-size farms generally utilize milk mostly by selling it to dairies. Furthermore, it was also observed that the findings are in accordance with the results of Çetin and Koyuncu (2000), Altıoğlu (2007), Araç (2007), Aysan Dayan (2007), Özkan (2008), Ceyhun *et al.* (2009), Obaido (2010), Kılıç *et al.* (2013), who observed that a significant portion of the consumption of milk obtained at sheep farms is for family purposes, while the remainder is generally sold as raw milk or is transformed into other milk products. However, milk is used only for the suckling of lambs at some sheep farms, and then the excess milk is sold (Bilginturan and Ayha 2009); whereas on other farms, 94.41% of the milk obtained is used for making cheese and the remainder is used as drinking milk (Acar and Ayhan 2012). The animals that are not included as breeding stock, or the breeding stock excess animals, are either first fattened after which they are sold to butcheries or they are directly sold to butcheries. The breeders generally either sell their animals at the markets themselves or sell them to the butcheries when the weight of the lambs is 40 kg on average at the end of the fattening period. The fattening method and the evaluation methods for the animals on the sheep farms are similar to those stated in other studies (Çetin and Koyuncu, 2000; Bostancı, 2006; Araç, 2007; Ceyhun *et al.*, 2009). Alexandre *et al.* (2009) also put forth that 65% of the breeders sell their animals to regular customers at the end of the fattening period. The methods for making use of the milk and breeding stock obtained depends on the region as well as the prominent products and market conditions of that region.

It was determined that the wool obtained is used for different purposes at the sheep farms included in the study. Small-size farms state that they have difficulties in selling the wool they obtain and thus use them to make quilts and mattresses for use in the establishments, whereas the majority of the medium- and large-size farms sell the wool they obtain. Large amounts of wool are obtained at the medium- and large-size farms depending on the number of animals. In parallel to this, the sales price of the wool increases.

It was determined in all farms included in the study that manure is generally used for the cultivation of fodder plants. Only a small amount of the manure obtained at the sheep farms can be sold. All farms that market the manure sell the manure directly. Similar to wool, large-size farms generate more manure because of the greater number of animals they have, and thus they can sell the manure more easily.

CONCLUSIONS

In conclusion, the effects of the decrease in the number of small ruminant in Turkey in recent years were also observed in the Bursa province. The increase of industrialization, the decrease in the population of villages, and intensive agriculture are prominent factors for the increasing tendency towards bovine animals. Changes in the number of sheep at the farms visited are due mainly to insufficiency of income and not employing any shepherds. It was observed in flock management applications that none of the significant developments were due to an increase in the size of the farm or a change in the education status of the farmers. Small-size farms are actually better than the approaches used in medium- or large-size farms.

The geographical structure of the Bursa province and its farmlands, modern animal farms, establishments that process animal products, sufficient facilities for national and international marketing, and proximity to large cities or markets provide significant opportunities for the development of small ruminant

breeding in addition to bovine and poultry breeding. In this scope, the utilization of approaches for increasing production and profitability in addition to the more active use of the already existing dynamics are important for the farms visited within the scope of this study.

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