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RESEARCH ARTICLE

Structural and Technical Characteristics of Purebred Kıvırcık Sheep Enterprises in Kırklareli Province

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ABSTRACT

It was aimed to determine the current general structure of purebred Kıvırcık sheep enterprises, main issues of breeders, and their expectations from the authorities. A questionnaire was applied to farmers in 47 enterprises regarding sheep breeding and various measurements/observations were conducted in the sheepfolds. It has been determined that most of the breeders had a near-lifetime sheep breeding experience and many family members contribute to the breeding. The most commonly used roughage was dry pasture grass and straw, and factory feed and wheat were mostly preferred as concentrate feed. As a result of the study, the amount of area per mother sheep (0.704) and rootstock sheep + one lamb (1.260) was found to be insufficient. Most reported diseases were Bluetongue (45.65%), respiratory system diseases (30.43%) and enterotoxaemia (10.87%) for sheep, and diarrhea/digestive system (45.65%) and respiratory system diseases (36.96%) for lambs. While nearly half of the breeders stated that they were satisfied with sheep farming, the vast majority (81%) stated that they would continue to breed. Most important problems stated by the farmers were feed prices, low product prices, diseases/deaths, finding a shepherd, lack of organization. Most important expectations from authorities were stated as solutions for health issues, marketing problems, increasing product prices and financial support.

Keywords: Breeder expectations, Kırklareli, sheep breeding, structural characteristics

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Kırklareli'nde Saf Kıvırcık Irkı Koyun Yetiştiriciliği Yapan İşletmelerin Yapısal Ve Teknik Özellikleri

ÖZ

Yürütülen çalışmada saf Kıvırcık koyun işletmelerinin mevcut genel yapısının, yetiştiricilerin temel sorunlarının ve yetkililerden beklentilerinin belirlenmesi amaçlanmıştır. 47 çiftlikte koyun yetiştiriciliği ile ilgili anket uygulanmış ve ağıllarda çeşitli ölçümler/gözlemler yapılmıştır. Yetiştiricilerin çoğunun yaşam boyu koyun yetiştirme tecrübesine sahip olduğu ve birçok aile üyesinin koyun yetiştiriciliğine katkıda bulunduğu tespit edilmiştir. En sık kullanılan kaba yem kuru mera otu ve saman olup, kesif yem olarak daha çok fabrika yemi ve buğday tercih edildiği gözlenmiştir. Çalışma sonucunda belirlenen anaç koyun (0.704) ve anaç koyun + bir kuzu (1.260) başına düşen alanı miktarları yetersiz bulunmuştur. Yetiştiriciler tarafından en sık bildirilen hastalıklar koyunlar için Mavi dil (%45.65), solunum sistemi hastalıkları (%30.43) ve enterotoksemi (%10.87) ve kuzular için ishal/sindirim sistemi (%45.65) ve solunum sistemi hastalıkları (%36.96) olmuştur. Yetiştiricilerin yaklaşık yarısı koyun yetiştiriciliğinden memnun olduklarını belirtirken, büyük çoğunluğu (%81'i) yetiştiricilik yapmaya devam edeceklerini beyan etmiştir. Yetiştiriciler karşılaştıkları en önemli sorunları yem fiyatlarının yüksek, ürün fiyatlarının ise düşük olması, hastalıklar/ölümler, çoban bulamama ve örgütlenme eksikliği olarak belirtmişlerdir. Yetiştiriciler, yetkililerin çözüm getirmesine ihtiyaç duydukları en önemli konuların; sağlık sorunlarının çözümü, pazar sorununun çözümü, ürün fiyatlarının ve desteklerin artırılması şeklinde ifade etmişlerdir.

Anahtar kelimeler: Kırklareli, koyun yetiştiriciliği, yapısal özellikler, yetiştirici beklentileri

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INTRODUCTION

Sheep breeding in Turkey is generally conducted extensively by villagers, in the form of traditional small family businesses, and largely based on natural pastures in which the nutritional needs of animals are often not adequately met. Additionally, many diseases such as brucellosis, foot-and-mouth disease, ecthyma, enterotoxaemia also cause significant losses in sheep breeding. Therefore, the maintenance, feeding and housing conditions that are widely applied in the country result in low productivity and producers cannot earn a sufficient income (Anonymous 1986). Factors such as high feed costs, extreme fluctuations in lamb and milk prices, inadequacy of subsidies and supports, inability of breeders to market their products at affordable prices, and difficulties in obtaining shepherds/workers negatively affect the sustainability of sheep breeding, especially in recent years. In this context, many breeders gave up sheep breeding and migrated to big cities; and this reduced the potential for animal food production. However, in Turkey, which has a rapidly increasing population, the need for animal-based foods is increasing day by day and meat imports are preferred because of insufficient domestic production. This framework indicates that to prevent the transitioning of sheep breeders from a producer position to a consumer position, various socio-economic conditions should be provided to have a sustainable sheep breeding in their villages. Therefore, primarily, it is necessary to examine the existing structural features of sheep breeding deeply, identify problems and develop suggestions for the solution of these problems.

Kırklareli province offers animal breeders the opportunity to graze their animals in the pasture for most of the year with its rich forest and pasture opportunities. For this reason, sheep breeders prefer to use natural food sources for their animals as long as possible. In seasons when climate and pasture conditions are suitable, lambs are grazed together with their mothers in pasture and are tried reaching slaughter maturity without extra feeding. Kıvırcık breed, which is widely grown in Bulgaria, Greece, and in Turkey (mostly in Marmara Region (especially in Thrace, Bursa, Balıkesir and Çanakkale) and some provinces of the Aegean Region (Manisa, İzmir and Aydın)), stands out with its thin tail and tasty meat. It is a sheep breed that is well adapted to the climatic conditions of the aforementioned region (Ekiz et al. 2009, Ekiz et al. 2021).

The Istranca mountains, which cover a significant part of Kırklareli, and the rich plant diversity in the region contribute to the Kıvırcık breed having more delicious meat compared to other indigenous sheep breeds. Although the Kıvırcık breed is at the forefront with its superior meat quality, the milk obtained from the Kıvırcık sheep is marketed to many large milk and dairy products processors in Thrace and is converted into many products, especially white cheese and sheep yogurt. In the past years, it was aimed to increase milk and fertility of Kıvırcık and by crossing some culture breeds, Türkgeldi and Tahirova genotypes were created. The dissemination of these genotypes in public herds turned into uncontrolled crossbreeding over time and a great decrease was observed in the pure Kıvırcık population. However, the purest specimens of the Kıvırcık breed continue to exist in Kırklareli, because the animal circulation is lower compared to other provinces in the Marmara region and that breeders prefer to breed pure Kıvırcık instead of crossbreeding. The Kıvırcık breed has been taken under protection by the public, by the project of "Breeding of the Kıvırcık breed in the hands of the people" carried out by the Ministry of Agriculture and Forestry.

Many survey studies have been conducted to determine the socio-economic, structural, and technical characteristics of sheep breeding enterprises in different provinces of Turkey and to determine the problems of sheep breeding (Ayvazoğlu Demir et al. 2015, Bilginturan and Ayhan 2009, Bostancı 2006, Ceyhan et al. 2015, Dellal et al. 2002, Gezer 2010, Kandemir et al. 2015, Karakuş and Akkol 2013, Koyuncu et al. 2006, Tüfekçi and Oflaz 2015). However, no research has determined the structural characteristics and problems of sheep breeding in Kırklareli. In this study, it was aimed to reveal the general characteristics of the pure Kıvırcık sheep breeding enterprises in the villages of Kırklareli city centre, herd management practices, the current situation of the sheep shelters, the main problems of the breeders and their expectations from the authorities.

MATERIAL AND METHODS

The data used in the study were obtained from 47 purebred Kıvırcık farms in Kırklareli. Recently, because of uncontrolled crossing studies, the number of pure Kıvırcık farms has decreased considerably. In the study, all sheep farms raising pure Kıvırcık sheep in the villages of Kırklareli city centre were determined as the target population. In this context, all enterprises involved in the "Breeding of the Kıvırcık breed in the hands of the public" project conducted by the Ministry of Agriculture and Forestry, and one enterprise that took part in the "On-Site Protection and Development of Pet Genetic Resources National Project" was visited.

Additionally, Kırklareli Sheep and Goat Breeders' Association visited other businesses that stated to breed pure Kıvırcık, and 5 businesses outside the scope of the above-mentioned Ministry of Agriculture and Forestry projects were included in the research. The study was conducted in April-May 2015. The questions asked by the researchers in the

face-to-face interviews with the sheep breeders and the data gathered during the observations and measurements made in the shelters are given below:

A. Demographic information of breeders: Age of the breeder, number of households, experience in sheep farming, education level, source and number of the shepherds

B. General characteristics of the businesses: Business structure, barn ownership, agricultural and livestock activities performed in the enterprise

C. Herd composition and size: Number of sheep and rams in the flock, number of yearlings, number of sheep per ram

D. General feeding schedule and pasture usage: Which months of the year the sheep and the rams are taken to pasture, which months of the year the sheep and the rams are fed in the barn, which forages and concentrates are used, where the forages and concentrates are obtained from.

E. Shelter characteristics and conditions: Shelter structure type, shelter age, shelter location, wall, roof and floor materials, ventilation type, shelter dimensions, presence of sections inside the barn (birth chambers, lamb compartments, breeding herd section, yard usage), floor area per animal and per sheep in the barn.

F. Health/liveability problems, herd health management and shelter hygiene practices: Diseases seen in the enterprise last year, frequency and causes of aborts, number of lambs died until weaning, lamb death causes, usage of internal/external parasitic pesticides, body and foot bath use, barn disinfection, lameness frequency in the herd, frequency of hoof care and control, frequency of mastitis in the herd, management of placenta and umbilical cord care, wild animal attack status, records kept by breeders.

G. Opinions of breeders about sheep breeding: Reasons for breeders to continue sheep breeding, Change in the amount of sheep in the last five years, level of satisfaction with sheep farming, the most important problems of the breeders and their expectations from the authorities, personal future predictions about sheep farming.

Statistical analysis

Data collected from Kıvırcık sheep breeders in Kırklareli through a questionnaire were arranged in the Microsoft Excel program, and SPSS 13.0 program was used for descriptive statistical analysis of the gathered data. The findings obtained in the study were presented as "the frequency and rate of observation" or "mean value and standard deviation".

RESULTS

The general characteristics of the breeders and the sheep farms are presented in Tables 1 and 2. It was observed that the majority of breeders (53.19%) are between the ages of 41-60, the average age of the breeders was 45, the average experience in sheep breeding was 39.18 years, and more than half of them were primary school graduates. While most of the breeders in the study stated that family members (44.68%) were working as shepherds, also, it was seen that the second most common shepherd practice was permanent workers (21.28%) employed in addition to family members. It has been reported that mostly 2 to 4 shepherds are used in the farms investigated in the study.

Table 1. General characteristics of the surveyed breeders.

Traits	N	%
Age of the breeder	47	
20-40	15	31.92
41-60	25	53.19
60+	7	14.89
Number of households	47	
2	4	8.51
3	5	10.64
4	10	21.28
5	11	23.40
6	7	14.89
7+	10	21.28
Years of experience in sheep farming	47	
<10	7	14.89
11-20	4	8.51
21-30	11	23.40
31-40	13	27.66
41+	12	25.53
Level of education	47	
Literate	1	2.13
Primary school	28	59.57
Secondary school	5	10.64
High school	9	19.15
Bachelor and above	4	8.51
Shepherd source	47	
Family only	21	44.68
Family + permanent worker	10	21.28
Family + hired / seasonal worker	6	12.77
External permanent worker only	9	19.15
Permanent worker + seasonal worker	1	2.13
Number of shepherds	47	
1	4	8.51
2	17	36.17
3	9	19.15
4	10	21.28
5	2	4.26
6+	5	10.64

Table 2. General characteristics of the surveyed sheep farms

Shelter Features	N	%
Enterprise structure	47	
Small family business in/near the village	29	61.70
Small family business in the forest	13	27.66
Large-scale enterprises	5	10.64
Barn property	47	
Owned	42	89.36
In partnership	0	0.00
Rented	5	10.64
Plant production status	47	
No	8	17.02
Yes	39	82.98
Grown plants*	47	
Wheat	35	39.74
Barley	20	51.28
Triticale	18	46.15
Corn	15	38.46
Oat	13	33.33
Sunflower	8	20.51
Rye	7	17.95
Vetch	7	17.95
Clover	1	2.56
Other livestock activities	47	
Does not breed other animal species	8	17.02
Breeds other animal species	39	82.98
Other animal species *,#	39	
Beef cattle	3	7.69
Dairy cattle	27	69.23
Water Buffalo	2	5.13
Goat	37	94.87

* The surveyed breeders were given the opportunity to specify more than one choice.
# It refers to other animal species bred by 39 enterprises that breeds other animals.

61.70 % of the 47 businesses in the project were small family businesses in/around the village, 27.66% were small family businesses in the forest, and 10.64% were large-scale enterprises. The average number of Kıvırcık sheep in the farms included in the study was 287.94, the number of Kıvırcık rams in the stock herd was 10.26, the number of rams used for the first time in breeding was 2.38, and the number of sheep per ram was 31.75 (not presented in the tables). It has been stated that 89.36% of the barn ownership belongs to the breeders themselves, most the breeders also produce crops in addition to sheep breeding, and the most planted products were wheat, barley, corn, triticale, sunflower and oats. It has been observed that approximately 83% of the breeders raise other animals besides sheep. It was seen that goats (94.87%) were the most common species bred as a secondary animal in Kıvırcık herds in Kırklareli, followed by dairy cattle farming (69.23%).

Table 3. The duration of pasture usage in the surveyed farms.

Pasture usage features	Mean	SD
The number of months in which the ewe sheep are taken to pasture	11.36	1.39
Number of months in which ewe sheep are fed only based on pasture	7.22	1.69
Number of months in which the rams were taken to pasture	10.05	2.72
Time spent on pasture in winter, hours/day	6.59	1.25
Time spent on pasture in summer, hours/day	12.03	1.88

Table 4. The roughage and concentrate feeds used in the farms and their supply types.

Feeds	N	%
Forages*	47	
Straw	42	89.36
Dry clover grass	10	21.28
Dry pasture grass	44	93.62
Corn silage	19	40.43
Beet pulp	19	40.43
Vetch	6	12.77
Concentrates*	47	
Factory feed	41	87.23
Barley	38	80.85
Wheat	40	85.11
Sunflower	1	2.13
Rye	12	25.53
Oat	7	14.89
Corn	5	10.64
Triticale	21	44.68
Roughage supply method	47	
From the farm itself	16	34.04
Bought	2	4.26
Both	29	61.70
Concentrate feed supply method	47	
From the farm itself	4	8.51
Bought	21	44.68
Both	22	46.81

*Surveyed breeders were given the opportunity to specify more than one choice

It was observed that the stock sheep herd was taken to pasture almost throughout the year. While sheep are fed only on pasture for an average of 7.22 months, rams are taken to pasture for 10-11 months. From the statements of the breeders, it was concluded that sheep graze in the pasture for about 6 hours a day during the winter months, and about 12 hours in the summer months (Table 3).

The most commonly used roughage sources in the enterprises were determined as dry pasture grass (93.62%) and straw (89.36%). It has been observed that dry alfalfa, corn silage, beet pulp and vetch are other roughage sources used in the region. The most preferred concentrate feed source was found as commercial factory feed (87.23%), which followed by wheat and barley. In 34.04% of the enterprises, the roughage is obtained entirely from the internal resources of the enterprise; while approximately 62% of them provided it both from internal sources and purchased from outside. In 44.68% of the enterprises, concentrate feed is supplied only from feed factories; while in 46.81%, it is provided from both the internal resources of the enterprise and the feed factories (Table 4).

Table 5. Shelter characteristics of the surveyed sheep farms

Barn features	n**	%
Barn type	46	
Closed barn	40	86.96
Shed	1	2.17
Closed barn + shed	5	10.87
Barn age	46	
0-5 years	3	6.52
6-10 years	15	32.61
11-20 years	12	26.09
21-30 years	8	17.39
31 years and above	8	17.39
Barn Location	46	
Underneath the house	1	2.17
Adjacent to the house	10	21.74
In a separate area within the village	11	23.91
Outside the village	11	23.91
In the forest	13	28.26
Shelter Wall Material *	46	
Brick	13	28.26
Briquette	18	39.13
Concrete	5	10.87
Stone	4	8.70
Wood or wood + nylon	14	30.43
Shelter Roof Material *	46	
Tile	16	34.78
Clay	2	4.35
Concrete	2	4.35
Tin	6	13.04
Fibrous cement (Eternit) / shingle	12	26.09
Wood or wood + nylon	14	30.43
Shelter Floor Material	46	
Soil	42	91.30
Concrete	2	4.35
Some parts are soil, some are concrete.	2	4.35
Ventilation type	46	
No ventilation	10	21.74
Only windows	3	6.52
Only chimney	15	32.61
Windows and chimneys	18	39.13
Barn with a maternity pen	6	13.04
Barn with a lamb growing pen	23	50.00
Floor area per animal (ewe and lamb) in the barn, (m^2/animal)	0.704	0.323
Floor area per ewe in the barn, (m^2/ewe)	1.260	0.534

* *Surveyed breeders were given the opportunity to specify more than one choice
** In a farm where the survey was applied, this parts of the survey could not be done.

It was determined that 86.96% of the examined enterprises were closed-type barns, while 10.87% consisted of covered barn + shed. The most common shelter age group was determined as "6-10 years" (32.61 %). Additionally, it was observed that a significant part of the enterprises preferred the shelters (28.26%) built in the forest. Notably, 21.74% of the enterprises do not have any ventilation system.

It was observed that about half of the examined farms had a separate lamb rearing section, but only 13.04% of the farms had a maternity pen. The floor area per animal (for ewe + lamb) in the barn was calculated as 0.704 m² and per ewe is determined as 1,260 m² (Table 5).

Table 6. Health parameters of Kivircik farms

Parameters	**n****	**%**
Diseases seen in the last 1 year *	46	
Respiratory system diseases	14	30.43
Enterotoxaemia	5	10.87
Brucellosis	3	6.52
Blue tongue	21	45.65
Ecthyma	4	8.70
Parasitic diseases	2	4.35
None	13	28.26
Amount of abort observed farms	44	95.65
	Mean	**SD**
Number of aborted sheep	16.13	38.16
Percentage of sheep that abort within the farm, %	4.59	5.20
Number of lambs died until weaning	21.80	41.05
Percentage of lambs died until weaning, %	9.46	7.45
Number of lambs died after weaning	0.28	1.03
Percentage of lambs died after weaning, %	0.28	1.03
	n	**%**
Cause of lamb deaths according to breeders *	46	
Diarrhoea / digestive system diseases	21	45.65
Respiratory system diseases	17	36.96
High twinning	7	15.22
Crush / jamming	2	4.35
Bad motherhood / Yearling ewes not taking care of their offspring	1	2.17
Dystocia	1	2.17
Feeding / feeding error	2	4.35
Negligence / Poor management	1	2.17

* Surveyed breeders were given the opportunity to specify more than one choice.
** In a farm where the survey was applied, parts of the survey related to health parameters could not be done.

The diseases, abort rates and causes of lamb deaths observed in the last 1 year, according to the breeder statements are presented in Table 6. It was stated that the most common disease in the herds was "blue tongue", (45.65 %) which was followed by respiratory system diseases (30.43%) and enterotoxaemia (10.87%), and abort was observed in almost all the enterprises (95.65%). Because of the calculations made according to the breeder statements, it was estimated that 4.59% of the sheep in the farms aborted. It has been reported that an average of 21.80 lambs (approximately 9.46% of lambs born) died per farm until weaning. It was determined that lamb deaths after weaning were quite low. The breeders stated i) diarrhea/digestive system diseases (45.65%) and ii) respiratory system diseases (36.96%) as the two most important causes of lamb death. Additionally, high twinning and crushing/squeezing of lambs were also listed as other important causes of lamb death.

Table 7. Some biosecurity practices in the surveyed sheep farms

Traits	**n****	**%**
Number of businesses applying parasitic pesticides	45	97.83
Number of parasitic pesticides applied per year	45	
1	9	20.00
2	32	71.11
3-4	4	8.89
Percentage of businesses applying a bath	5	10.87
Percentage of businesses applying a foot bath	4	8.70
Percentage of businesses performs hoof control	9	19.57
Percentage of businesses applying disinfection inside the barn	43	93.48
Substance used for disinfection	43	
Caustic lime	35	81.40
Chemical disinfectants	0	0.00
Caustic lime + Chemical disinfectants	8	18.60
The frequency of disinfection	43	
Monthly or more frequent	17	39.53
Every 3-4 months	8	18.60
Every 6 months	14	32.56
Once in a year	4	9.30
Method of intervention in the placentas*	46	
Buried	3	6.52
Given to dogs	40	86.96
Thrown away to garbage	8	17.39
Does any umbilical cord care performed?	46	
Yes	28	60.87
No	18	39.13
Have there been any wild animal attacks in the last 1 year?	46	
Yes	35	76.09
No	11	23.91

* Surveyed breeders were given the opportunity to specify more than one choice.
** In a farm where the survey was applied, parts of the survey related to health parameters could not be done.

Almost all the breeders reported that they applied parasitic pesticides to sheep (97.83 %). It has been declared that 71.11% of the enterprises is applied twice a year with parasitic pesticides. It was determined that the rate of enterprises that bathed the sheep (10.87%) and applied footbath (8.70%) were quite low. Similarly, it was determined that the hoof control of sheep was conducted in few enterprises. It was stated that 93.48% of the enterprises disinfect inside the barn at varying times during the year (Table 7).

It is seen that in approximately 90% of the surveyed enterprises, placentas are fed to dogs. Throwing into garbage or burying the neonatal membranes are less common methods. It has been reported that umbilical cord care of lambs after birth is performed in 60.87% of the enterprises. Respectively, 76.09% of these enterprises stated that they have faced a wild animal attack at least once in the last year (Table 7).

Table 8. The records kept in the farms and the lameness and mastitis status of the farms according to the breeders

Traits	n**	%
Records kept in the farms*	47	
None	5	10.64
Only the records for Ministry of Agriculture and Forestry projects	35	74.47
Disease, treatment, drugs, vaccinations etc.	4	8.51
Death records of animals and cause of deaths	6	12.77
Feed consumption	3	6.38
Date of rams joining to the ewe herd	4	8.51
Percentage of breeders indicating lameness in their flock	38	82.61
Percentage of breeders indicating mastitis in their flock	35	76.09
Percentage of businesses performing mastitis treatment ***	31	88.57
	Mean	**SD**
Percentage of lame animals in their flock according to the breeders	6.67	10.67
Percentage of animals with mastitis in their flock according to the breeders	1.31	1.44

** Surveyed breeders were given the opportunity to specify more than one choice.
** In a farm where the survey was applied, parts of the survey related to health parameters could not be done.
*** Calculated on the basis of businesses stating that mastitis is observed.

Table 9. Evaluations of the sheep breeders who were surveyed about their own businesses.

Reviews of sheep breeders	N	%
Reason for sheep farming	47	
Main occupation	44	93.62
Additional income	3	6.38
Satisfaction level with sheep breeding	47	
Satisfied	20	42.55
Partly satisfied	14	29.79
Not satisfied	13	27.66
Change in the number of sheep in the last 5 years	47	
İncreased	22	46.81
Decreased	7	14.89
Unchanged	18	38.30
Personal vision of future for sheep farming*	47	
Planning to continue sheep breeding	38	80.85
Thinking his/her children will not continue to sheep breeding	16	34.04
Thinking that he/she will quit sheep breeding in a short time	9	19.15

* Surveyed breeders were given the opportunity to specify more than one choice.

It is seen that most of the breeders do not keep records, except for the records kept within the scope of the "Breeding of the Kıvırcık breed in the hands of the public" project in most of the enterprises. The 82.61% of the breeders stated that lameness was observed in their herds; additionally, 76.09% of them stated that mastitis was observed. In light of the information given by the breeders, it is understood that 6.67% of the animals in their herds are lame and 1.31% have mastitis (Table 8).

It was stated that sheep breeding is the main occupation in 93.62% of the surveyed enterprises. 42.55% of the farmers reported that they were satisfied with the sheep breeding, while 27.66% of them reported that they were not. 46.81% of the breeders stated that the number of sheep in their herd has increased in the last five years and 80.85% of the farmers declared that they will continue to breed sheep. However, 34.04% of the breeders stated that they thought that their children would not breed sheep (Table 9).

The most important 5 problems stated by the farmers who bred Kıvırcık are listed as feed prices > low marketing/product prices > animal diseases, deaths > not being able to find a shepherd > organization. However, 31.91% of the breeders stated that they did not have any expectations from the authorities.

The most important expectations of the breeders; i. solution of health problems, ii. solution of the market problem, iii. increase in product prices, and iv. was expressed as the establishment of an animal market (Table 10).

Table 10. The most important problems of sheep breeding according to the surveyed breeders and the expectations of the breeders from the authorities.

Traits	N	%
Problems according to breeders*		
Marketing issues / Low product prices	36	76.60
High feed prices	37	78.72
Labour expenses	11	23.40
Insufficiency of pasture	3	6.38
Insufficiency of shepherd	19	40.43
Finding quality breeding sheep	2	4.26
Diseases / Deaths of animals	24	51.06
Organizing with other breeders	14	29.79
Old barn-shelters	1	2.13
Low number of veterinarians specialised about sheep breeding**	1	2.13
The social status of the sheep breeder / The problem of finding a spouse	2	4.26
Price instability	3	6.38
High broker profits / Determination of the product price by brokers	3	6.38
Have no problem	3	6.38
Solutions expected from the authorities *		
Solving the marketing problem	13	27.66
Solving health problems	24	51.06
Solving the credit problem	1	2.13
Solving the supplying the breeding animal problem	1	2.13
Increasing product prices	8	17.02
Increasing supports	1	2.13
Ensuring stability in the market	1	2.13
Establishment of animal stock market	3	6.38
There is no expectation	15	31.91

* Surveyed breeders were given the opportunity to specify more than one choice.
** Insufficient number of veterinarians who are experts in sheep breeding and will provide information on feeding issues

DISCUSSION

Considering the socio-cultural structure of the breeders; it is seen that the average age of the breeders is 45, and the experience period in sheep breeding is 39 years. These findings indicate that breeders have been dealing with sheep breeding since childhood and young people do not show much interest in sheep breeding. The decrease in young labour in sheep farming suggests that it may become an important threat to the sustainability of sheep farming soon. In many studies conducted in different regions of Turkey, it has been reported that sheep and goat breeding are mostly performed by middle-aged and older people (Acar and Ayhan 2012, Gezer 2010, Karakuş and Akkol 2013, Koyuncu et al. 2006,

Tüfekci and Olfaz 2015, Karadaş 2017, Kandemir et al. 2015, Kızıloğlu and Karayaka 2014).

When the educational status of the breeders is examined; approximately 27% of them are high school and above graduates, while 70-73% of them are primary school-secondary school graduates and there are no illiterate breeders. These results show that the education level of sheep breeders in Kırklareli is generally higher than that reported for sheep breeders in other regions of Turkey (Acar and Ayhan 2012, Bilginturan and Ayhan 2009, Bostancı 2006, Ceyhan et al. 2015, Karadaş 2017, Karakuş and Akkol 2013, Kızıloğlu and Karayaka 2014, Koyuncu et al. 2006, Tüfekçi and Olfaz 2015).

The study results showed that the shepherd's task is performed only by family members in approximately 45% of the sheep farms in Kırklareli. It is thought that the shepherding service is largely performed by individuals from within the family, because almost all the enterprises raising the Kıvırcık breed in the study were small family businesses. Considering that income from sheep breeding is very limited, it is seen that it is not an economical method for small family businesses to employ shepherds from outside the family. Similar to the results obtained in this study, Acar and Ayhan (2012) found 93.94% of goat farms in Isparta, Bilginturan and Ayhan (2009) reported 97.4% of sheep farms in Burdur, and Ceyhan et al. (2015) determined that in 63.5% of the sheep farms in Niğde province, the shepherd service is performed by family members.

Approximately 90% of the businesses visited within the scope of the project are small family businesses. This situation shows that the number of large-scale enterprises that also apply modern production techniques in Kırklareli is quite limited. The increase in the number of professionally managed large-scale enterprises in the region suggests that it can make a great contribution in terms of conducting more efficient and economical sheep breeding, improving the quantity and quality of the products obtained from sheep breeding and increasing the income of sheep breeders.

It has been observed that approximately 83% of sheep breeders also raise other animal species. It has been determined that approximately 95% of the Kıvırcık farms raise goats and 70% of them raise dairy cattle. Ceyhan et al. (2015) also reported that sheep farms in Niğde province reared the most goats and cattle beside sheep. Bilginturan and Ayhan (2009) determined that 46.9% of the sheep farms in Burdur also conduct other animal husbandry activities besides small ruminant breeding. Gezer (2010) reported that 46% of sheep breeders in Sivas also rear cattle. These results show that Kıvırcık sheep breeders in Kırklareli are more inclined to raise animals from other species compared to sheep breeders in other regions of Turkey.

To conduct sheep breeding activities economically, it is necessary to make use of natural resources, like pasture, as much as possible. In the study, it was observed that in Kırklareli, the Kıvırcık ewes were taken to pasture almost throughout the year, and that in 7 months of the year, the ewes were fed only on pasture, and no additional feed was given to these sheep in the barn. In other studies conducted in Turkey, the pasture usage periods were determined by Bilginturan and Ayhan (2009) as 7.27 months, Gezer (2010) and Dellal et al. (2002) approximately 7 months, Karakuş and Akkol (2013) as 7-8 months, Kızıloğlu and Karayaka (2014) as 6-7 months, Tüfekci and Olfaz (2015) stated that 40% of breeders in Kastamonu keep their animals in the pasture for 7-8 months and 60% of them keep it in the pasture for 9-10 months. The results obtained regarding pasture use of Kıvırcık sheep breeders in Kırklareli indicate that Kırklareli is more advantageous than many other regions of Turkey in terms of grazing opportunities.

It is seen that in 34.04% of the Kıvırcık farms, the roughage is provided entirely from the farm's own internal resources. However, in approximately 45% of the Kıvırcık farms, concentrate feed is supplied only from the feed factories; while 46.81% of them was supplied from both the internal resources of the enterprise and feed factories. The fact that 65.96% of the enterprises had to buy roughage and 91.49% of them had to buy concentrated feed shows that the Kıvırcık enterprises in Kırklareli are quite inadequate in meeting their own feed needs. Bilginturan and Ayhan (2009) stated that 53% of the sheep farms in Burdur raised their own feed, Bostancı (2006) stated that 80% of the sheep farms in Kırıkkale purchased factory feed from outside, Gezer (2010) stated that 92% of the sheep farms in Sivas made the concentrate feed by themselves, Dellal et al. (2002) determined that 61% of sheep and goat farms purchased factory feed. Karakuş and Akkol (2013) reported that 12.3% of the small ruminant farms in Van can provide roughage and 5.7% of them use concentrate feed from their own internal resources. The literature summarized above point out that the inadequacy of sheep farms in the production of fodder crops is an important problem observed in many regions of the country. However, the current research results show that the inadequacy of forage crop production in sheep breeding enterprises in Kırklareli is much more evident.

It was determined that the sheep was fed only on pasture for about 7 months in the Kıvırcık farms; in other periods (usually from mid-November to the end of March), the most common roughage given in addition to pasture was the straw (89.36% of enterprises) and dry pasture grass (93.62% of enterprises). It has been reported that straw, which is a poor quality fodder, is preferred as the main source of roughage in the winter feeding of broodstock sheep in sheep farms in other regions of Turkey as well as in Kırklareli (Bilginturan and Ayhan 2009, Gezer 2010, Dellal et al. 2002, Kandemir et al. 2015). This indicates that to conduct a more efficient sheep

breeding, the awareness of the breeders on animal nutrition should be increased and there is a need for studies to produce and spread higher quality feed such as alfalfa.

It has been observed that most Kıvırcık farms are closed barns and are built on soil ground. Bricks and briquettes are mostly used as wall materials in businesses located in or near the village, and materials such as tile, fibrous cement (Eternit®) / shingle and tin are used as roofing materials. Building materials used in small family businesses in or near the village found to be consistent with the statement of Ceyhan et al. (2015) for Niğde province sheep pens. On the other hand, it is seen that materials such as wood, brushwood, nylon, burlap pieces are used as wall and roof materials in family businesses in the forest. It is seen that the forest family businesses in Kırklareli differ from many regions of Turkey in terms of shelter building materials.

One in five businesses (21.74%) included in the study does not have windows or chimneys to provide ventilation. Bostancı (2006) reported that 46.7% of sheep pens in Kırıkkale did not have chimneys. Dellal et al. (2002) determined that the percentage of barns without chimneys in small cattle farms in the provinces of the GAP region was 86.5%. Sheep pens in Kirklareli seem more ventilated compared to the previously reported studies, although, not providing any form of ventilation is an unacceptable situation for welfare.

To reduce neonatal lamb deaths due to crushing and to establish a stronger and quicker bond between mother and lamb, it is recommended that ewes whose birth is approaching should be taken to the maternity pen and if possible, they should be kept here with their lambs for three days after birth (Dwyer 2008). Although 38% of the Kıvırcık farms do not have fixed maternity pens, it is seen that the breeders have created a separate shed within the barn for the ewes that are about to give birth. In this regard, the breeders should be informed and advice should be given to breeders about the construction of fixed maternity pens as far as the barn sizes allow.

The ideal density in sheep pens is reported as 0.70-1.00 m^2 per ewe without a lamb, 1.20-1.50 m^2 per ewe with 1 lamb and 1.50-1.75 m^2 per ewe with 2 lambs (Akçapınar 1994). In Annex A of the European Union directive no. 86/609, it is recommended to provide 1.5 m^2/sheep floor area for sheep weighing 35-60 kg. However, Anonymous (2020), suggested providing 3 m^2 area per sheep with lambs less than 6 weeks old for an ideal welfare level. Considering the density levels in the enterprises individually; it is seen that the floor area per animal (sheep + lamb) in the barn was less than 0.70 m^2 in 59.6% of the Kıvırcık farms. The ratio of farms with a floor area of less than 1.20 m^2 per ewe was determined as 51.06% (Results are not presented in the tables). These findings show that there is a need to inform the breeders about decreasing stocking density in sheep pens.

Breeders reported that the most common disease observed in the last year was "blue tongue" (45.65%). However, it should be kept in mind that this result is a special case of the year in which the research was conducted. Additionally, respiratory system diseases (30.43%) and enterotoxaemia (10.87%) were also determined as frequently observed diseases. It has been reported that 6.52% of the Kıvırcık enterprises had brucellosis in the last 1 year. It was calculated that abort was observed in 95.65% of the farms and an average of 4.59% of the sheep within the farm had abort. Bilginturan and Ayhan (2009) reported that external parasitic diseases, respiratory diseases and enterotoxaemia were the most frequently observed diseases in sheep farms in Burdur. Bostancı (2006) listed the most common diseases in sheep breeding farms in Kırıkkale as foot and mouth disease, smallpox, brucellosis and hoof diseases. Dönmez (2008) stated that the most common diseases encountered by sheep breeders in Bursa were enterotoxaemia with 4.3%, footstool with 8.5%, brucellosis with 10.6%, and small ruminant plague with 17%. In addition, they reported that 59.6% of the breeders in their study were encountered all of these diseases.

Karakuş and Akkol (2013) reported that the most common diseases in small ruminant farms in Van were external parasites (65.36%) and respiratory diseases (52.19%); they also determined that the rates of smallpox (44.57%), brucellosis (48.96%) and foot and mouth disease (44.57%) were quite high. It is seen that there are fewer disease problems in the Kıvırcık enterprises in Kırklareli compared to other studies. It is thought that the problems related to diseases such as foot and mouth and smallpox are observed much less in the enterprises visited within the scope of the research is due to the regular and successful vaccination of almost all of these enterprises by the Provincial Directorate of Agriculture and Forestry.

Abort is a serious economic loss and was observed in 95.65% of the Kıvırcık farms and an average of 4.59% of the sheep in the farms had aborted. The average abort rate in the studies conducted in different regions of Turkey was reported as 16.62% by Bostancı (2006), 3.06% by Dönmez (2008), 7.97% by Acar and Ayhan (2012). It is seen that the rate of aborted sheep determined for the Kıvırcık farms is compatible with the results obtained in other studies.

The results of the survey showed that 9.46% of live-born lambs died during the period until weaning, and mortality of lambs after weaning was very low. The breeders stated that diarrhea/digestive system diseases > respiratory system diseases > high twinning as the most important causes of lamb death. Bilginturan and Ayhan (2009) calculated the lamb mortality rate as 7.57% in sheep farms in Burdur. Karakuş and Akkol (2013) determined the lamb

mortality rate as 9.50% in small ruminant farms in Van. Kandemir et al. (2015) reported that 80.1% of sheep and goat farms in İzmir had lamb death during the rearing period, and the most important causes of the deaths were cold shock (44.8%), hunger (19.2%) and diarrhea (12.3%). It is seen that the lamb mortality rates in Kıvırcık farms in Kırklareli are relatively high. For this purpose, it is seen that there is a need to pay attention to breeding hygiene practices, especially for digestive and respiratory system diseases and to inform breeders about health protection practices.

It was determined that almost all of the Kıvırcık sheep breeding farms in Kırklareli use parasitic pesticides as a routine practice. The rate of enterprises applying a bath (10.87%) was found to be very low. On the other hand, it has been reported that 93.48% of the Kıvırcık farms performs shelter disinfection inside the barn regularly. Similarly, Bostancı (2006) reported that external parasitic control was performed in 97.78% of sheep breeding farms in Kırıkkale, and shelter disinfection was applied in 88.89% of the farms. Ceyhan et al. (2015) also reported in their study in Niğde that rate of businesses that use baths is very low. However, the rate of enterprises applying disinfection was determined as 15.2% and 73.7%, respectively, in studies conducted in Bingöl (Kızıloğlu and Karayaka 2014) and Kastamonu (Tüfekçi and Olfaz 2015).

82.61% of the farmers in the study stated that lameness was observed in varying amounts of sheep in their farms. Breeders reported that an average of 6.67% of the sheep had lameness problems. The rate of enterprises applying foot bath was determined as 8.70%, which is significantly inadequate and considering that foot bath is applied so little, the lameness rates determined in the enterprises are quite expected. Bostancı (2006) reported that foot baths were not applied in any sheep farms in Kırıkkale and hoof diseases were among the frequently observed diseases. Kandemir et al. (2015) reported that 98.8% of the small ruminant farms in İzmir do not have a foot bath.

It was determined that the enterprises other than the enterprises within the scope of the projects conducted by the Ministry of Agriculture and Forestry did not keep any records. It is seen that the majority of the enterprises that keep records within the scope of the projects of the Ministry only keep the records requested within the scope of the project. It is seen that the records on selection and sorting processes, health and disease records, feed consumption and economic parameters are seldom kept. Similarly, Bilginturan and Ayhan (2009) reported that 86.6% of the sheep farms in Burdur, Karakuş and Akkol (2013) stated 61.95% of the small ruminant farms in Van, Kızıloğlu and Karayaka (2014) reported 92.7% of the sheep farms in Bingöl and Şahinli (2014) determined that 52% of the sheep farms in Karaman did not keep any records. The findings obtained in the study are similar to previous statements.

It was stated that sheep breeding is the main business in 93.62% of the enterprises. While 42.55% of the breeders stated that they were satisfied with the sheep breeding, the rate of those who were not satisfied was determined as 27.66%. It was indicated that the number of sheep increased in the last five years in 46.81% of the farms, while the decrease in the number of sheep was determined as 14.89%. 80.85% of the Kıvırcık breeders stated that they will continue to breed sheep, however, 19.15% stated that they will quit sheep farming soon. However, 34.04% of the breeders stated that they thought that their children would not breed sheep. Bilginturan and Ayhan (2009) determined that 64.4% of the sheep breeders in Burdur were the only source of livelihood, 63.9% were satisfied with sheep breeding, and 43.3% were considering increasing the capacity. Dellal et al. (2002) determined that 84.9% of the ovine breeders in the provinces of the GAP region (Diyarbakır, Şanlıurfa, Gaziantep, and Adıyaman) and Karakuş and Akkol (2013) stated that 60.84% of the ovine farms in Van province was determined this production branch was their only source of livelihood. The fact that approximately 30% of the sheep breeders in Kırklareli are not satisfied with this field of activity, 15% decreased the number of sheep in their herd, 20% think of quitting sheep breeding soon, and most importantly, 35% think that their children will not be a sheep breeder, rated major threats in the region. Because of the improvement in living standards, especially the younger population does not want/contempt sheep breeding, which is a laborious business line, and it is seen that the migration from the village to the city has accelerated. This situation causes the problem of the evacuation of villages as well as the decrease in animal food production.

The last part of the study was about the most important problems of sheep breeding according to the breeders and 78.72% of the farmers reported high feed prices, 76.60% low marketing/product prices, 51.06% animal diseases and deaths, 40.43% did not find a shepherd, 29.79% insufficient organization among the sheep breeders as the most important problems of sheep breeding. The rate of breeders who stated that they did not see any problems was determined as only 6.38%. Bilginturan and Ayhan (2009) listed the most important problems of breeders as a marketing problem (39.1%), high feed prices (23.1%), insufficient pasture land (21.8%), credibility problems (9.2%). Ceyhan et al. (2015) reported that 70.8% of sheep farms in Niğde stated that the most important problem was expensive feed prices and the inadequate and poor quality of the pastures. Ceyhan et al. (2015) reported that 70.8% of the sheep breeders in Niğde declared that the most serious problem was the expensive feed prices and the inadequate and poor quality of pastures. According to breeders from the study of Ayvazoglu

Demir et al. (2015), the most important problems were high feed prices (24.2%), lack of reliable shepherds (18.2%), low demand (15.2%), diseases (13.6%), low wool prices. (12.1%), the ineffectiveness of unions/cooperatives (10.6%), and low-quality of pastures (6.1%). These notifications show that problems such as high feed prices, marketing problems, lack of a shepherd, animal diseases are among the most important problems of sheep breeding in many regions of Turkey. However, fewer complaints (6.38%) regarding the inadequacy of pasture in the surveyed enterprises may be related to the fact that these enterprises are mostly located in the high villages of the Strandja mountains or forest areas.

The most important expectations of the breeders from the authorities were solution to health problems (51.06%), solution of marketing problems (27.66%) and an increase in product prices (17.02%). However, notably the expectations of breeders from authorities regarding the supply of pasture and breeding animals are very limited. The 51.4% of the sheep breeders in Burdur stated that they wanted the market problem, 14.7% the credit problem, and 10% the health problems of animals to be solved. (Bilginturan and Ayhan 2009). On the other hand, unlike the Kıvırcık breeders in Kırklareli, 15.1% of the sheep breeders in Burdur demanded that the pasture problem and 7.7% the breeding animal supply problem to be solved.

CONCLUSION

As a result, approximately 90% of the Kıvırcık sheep breeding enterprises visited within the scope of the project were small family businesses. It has been determined that the average herd size in the small family businesses was 197 heads. It is seen that approximately ¼ of these enterprises do not have chimneys or windows for barn ventilation. It is seen that very few of the small family businesses have a fixed maternity pen and the stocking density is generally high. It has been determined that most of these enterprises cannot meet their roughage and concentrate feed needs from internal sources and they buy feed from outside. Almost all of the investigated small family businesses were produced with traditional methods; herd management, selection-sorting, production planning, product marketing and income-expenditure follow-up are conducted amateurishly. It may be possible for the breeders in the region to continue sheep breeding if they have a satisfactory level of income. To increase the income of sheep breeding enterprises and for sustainable sheep breeding, "i. Continuing the pasture-based feeding of the stock sheep herd, ii. Increasing forage crop production, iii. Improving shelter conditions, iv. Increasing herd size (capacity), v. Performing herd management and marketing operations more professionally, vi. Developing product marketing strategies and acting jointly, if possible, under the coordination of the Sheep and Goat Breeders' Association, vii. It is recommended that training seminars and courses be organized by the Provincial Directorate of Agriculture and Forestry and the Sheep and Goat Breeders' Association on record keeping, health protection, shelter hygiene and care-feeding procedures for breeders.

Ethics Committee Information: This study is not subject to HADYEK's permission in accordance with Article 8 (k) of the "Regulation on Working Procedures and Principles of Animal Experiments Ethics Committees".

Conflict of Interest: The authors declared that there are no actual, potential or perceived conflicts of interest for this article.

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PDK, AY and BE designed the experiment. The data acquisition was performed by PDK, HY, NÖ, RC, ÖK, AY and BE. PDK and BE did the statistical analysis. PDK wrote the paper. BE supervised all the procedures. All authors reviewed and approved the submitted paper.

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