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RESEARCH PAPER

Investigation of Structural Characteristics of Central Anatolian Merino Sheep Farms and Effectiveness of the Breeding Project in Ankara Province

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Abstract

The aim of this study is to determine the general characteristics and management and feeding practices of 33 Central Anatolian Merino sheep farms in Ankara within the scope of the "National Project for Community-based Small Ruminant Breeding" coordinated by General Directorate of Agricultural Research and Policies. Within the scope of this purpose, a survey consisting of a total of 78 questions was conducted with the farmers. The questionnaire consists of questions about general information about the farmers and farms, herd management, determination of the care and feeding methods of the animals and the effectiveness of the breeding project. At the end of the study, it was determined that 60% of the breeders were between the ages of 41-50, 90.91% of them were primary and secondary school graduates, and all of them kept regular records for herd management. Sheep breeders interviewed that they do supplemental feeding (approximately 34%) before mating and that they are milking by hand. Sheep breeders stated that they gained the habit of keeping records thanks to the breeding project, lamb rearing and breeding selection were made more effectively, so they benefited positively from the project. Furthermore, it was determined that the breeders wanted to stay in the project and wished for the project to continue.

Introduction

Livestock farming, one of the important branches of agriculture, is a strategic and sustainable business line and is among the most important inventions of human history. The main factor that pushes people to this way is the nutrition they need to survive. Although plant-based foods are needed for nutritional purposes, animal proteins are indispensable for a balanced and adequate diet (Ordu and Zengin, 2020). In order to meet the need for animal protein in Türkiye, cattle, sheep, poultry and fish are raised.

In the 1980s, plans were made to build livestock farming on cattle and poultry breeding in Türkiye. During these periods, the number of goats was reduced on the grounds that they harmed the forest, and even crop production alternatives were offered to goat breeders. In addition, there were not made any saving on sheep breeding in the same time. During this period, the number of small ruminants decreased significantly, the number of sheep, which was approximately 40 million heads, decreased to 21 million heads, and the number of goats, which was 13 million heads, decreased to 5 million heads.

While determining development plan strategies in countries, agricultural production is often ignored or put in the background. However, the basis of the industry is based on agriculture. Considering agriculture and industry together in every future projection will be a right step in development moves. Türkiye has different cultures in terms of animal production. This diversity includes geographical structure, tradition in production and product richness.

Products obtained from sheep breeding, which is an important branch of animal husbandry, provide benefits at different points of life. Starting from this point, agricultural policies to be followed are also essential for sustainability in production. In order to achieve this, each region and even each province, if necessary, must be evaluated separately in terms of agricultural production and the general situation must be determined.

In terms of both the improvement of sheep breeds and the continuation of production in rural areas, the project named Central Anatolian Merino (CAM) Improvement in Ankara Province" belong to "National Project for Community-based Small Ruminant Breeding (HEKIP) is supported by

General Directorate of Agricultural Research and Policies. Within the scope of this project, data obtained from animals are evaluated and breeding is carried out. In this research, the general breeding conditions, care and feeding conditions of the breeders included in the project and the effect of the applied breeding project were revealed. In the face-to-face survey conducted in the farms within the scope of the study, the general conditions of the farmers such as age, educational level and experience in sheep breeding, as well as the breeding practices, management and feeding methods of the farms were examined.

The materials and method used in the study are explained in the next section. The findings were then discussed. Finally, the study has been concluded.

Materials and Methods

The material of research consisted of 33 CAM sheep farms and breeders in HEKIP carried out under the coordination of General Directorate of Agricultural Research and Policies. The sheep enterprises examined within the scope of the study are located in Polatlı, Haymana, Güdül, Sincan, Bala, Şereflikoçhisar, Kızılcahamam and Elmadağ districts of Ankara province. The CAM sheep breed raised in the study was developed as a result of the crossbreeding of German Meat Merino and Akkaraman sheep in order to produce high amounts of meat and fleece in the arid pasture conditions of Central Anatolia.

Survey questions, which was totally 4 main sections and 78 questions, were asked to breeders. The survey questions were created from the general characteristic farms in first part, the herd management in second part, the feeding methods in third part and the national project achievements in fourth part. Surveys were conducted face to face with breeders.

Results and Discussion

In this study we conducted for CAM breeders in Ankara, 18-40, 41-60 and 61 and over age distributions of breeder were determined respectively 24.24% (8 farmers), 57.58% (19 farmers) and 18.18% (6 farmers) (Table 1). When we look at the age groups, it is seen that young breeders are in the majority. This situation can be interpreted as the demand for sheep breeding in the region continues.

Table 1 Social Situation of CAM Breeders

Age	n	%	**Experience (years)**	n	%
18-40	8	24.24	1-10	2	6.06
41-60	19	57.58	11-20	3	9.09
61 and More	6	18.18	21-30	5	15.15
Educational Background			31 and More	23	69.70
Not Literate	0	0	**Land Adequacy**		
Primary school graduate	26	78.79	Sufficient	27	81.82
Secondary school graduate	4	12.12	Insufficient	6	18.18
High school graduate	2	6.06			
Undergraduate and above	1	3.03			

n: Number of CAM sheep breeders

Although there are no illiterate sheep breeders in this study, a significant proportion of them are determined primary school graduates (78.79%). Although the rate of secondary school and high school graduates is low (12.12% and 6.06%), the presence of breeders with a bachelor's degree can be considered a pleasing situation. Because, as in other fields, education in agricultural activities is very important to increase the quality and quantity in production. This will only be possible with education. Gül et al. (2022) in Aksaray province and Ceyhan et al. (2015) in Niğde province reported in their study that sheep breeders were generally primary school graduates. The study is similar to other studies in this aspect.

When the producers who participated in our study were asked about their experience, 23 farmers (69.70%) stated that they had been doing sheep breeding for more than 31 years. 81.82% of these farmers states additionally that they had sufficient land. In their study conducted in Mersin and Muğla regions, Tüney Bebek and Keskin (2018) and Aydın and Keskin (2018) stated that sheep breeders experience was respectively 25.9 and 27.6 years. The experience period of the sheep breeders in our study were found to be close to the experience period determined in previous studies in the literature (Gül et al., 2009; Gül and Örnek, 2018).

Breeders (27.28%) generally prefer between March and December throughout the year for grazing (Figure 1). Others graze their sheep on pastures between March-November (18.18%), April and November (15.15%), April-December (15.15%) and January-December (3.03%). Demir et al. (2015), in their study conducted in Eastern Anatolia Region, reported that sheep were grazed on pastures between April and December. The condition of pastures can be affected by climatic conditions. In addition, the amount and duration of annual rainfall are one of the most important factors. The difference between regions can be explained by climatic conditions and the status of the grass population in the pasture. Breeders who were within the scope of the project and participated in our survey were asked about their goals in sheep breeding and the answers received are given in Figure 2. It was determined in this study that some of them breed sheep in order to have milk (12.12%) and breeding stock (48.48%). Gül et al. (2022) announced that small sheep breeders in Aksaray province generally produce meat and milk. However, Aydın and Keskin (2018) stated that breeders in Muğla province mainly operate for the purpose of meat production.

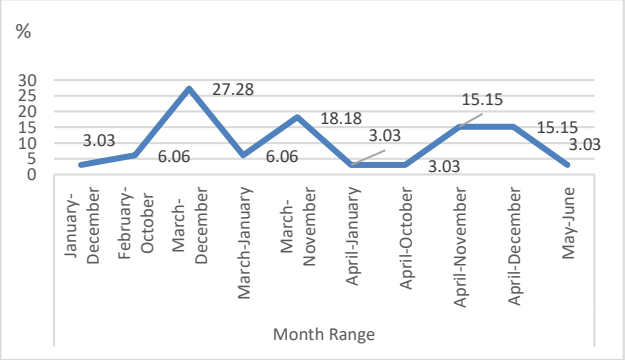

Figure 1 Grazing Duration and Pasture Periods (%)

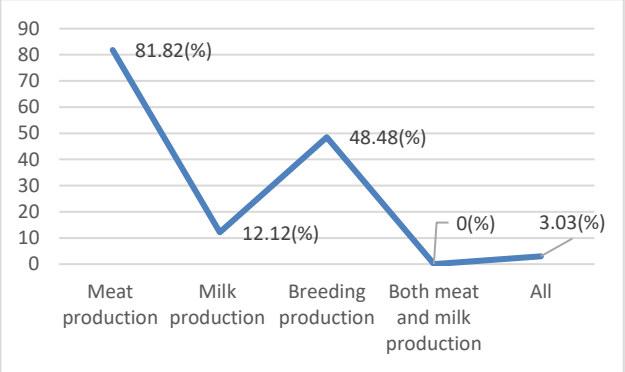

Figure 2 CAM Breeding Objectives (%)

The majority of CAM sheep breeders in our study state that male and female animals were used breeding age before the age of 18 months (78.79% and 84.85%) (Figure 3). In addition, some breeders stated to prefer that the first mating period of male and female yearlings is after 18 months of age. Gül et al. (2022) reported in Aksaray province that female yearling was used breeding at the age of 12 or 20 months. Ceyhan et al. (2015) stated that it was as 18.2 months for male yearlings. It is of great importance for male and female animals to be used for breeding to complete their biological and physiological development in terms of herd continuity and reproductive health.

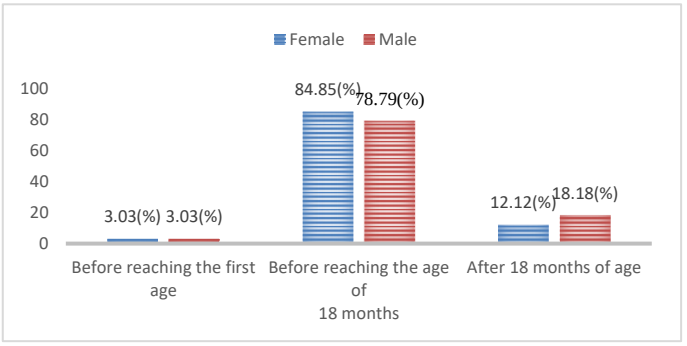

Figure 3 Age of First Breeding of Male and Female Yearlings

It has been determined that breeders generally make in a free mating (84.85%), however 15.15% of them use class mating (Table 2). It determineted in study that most farmers (87.88%) do not apply any hormones for oestrus synchronization, while 12.12% of them uses hormones. While breeders stated that they mostly kept their rams in the herd only during the mating period (96.97%), 1 breeder stated that they kept them in the herd all the time. Mating method of sheep in Türkiye is generally in the form of free mating. Lack of record keeping in herds, housing problems in breeders and lack of information of breeders can be considered among the biggest factors (Behrem and Keskin, 2013; Özyurek et al., 2018; Özsayın et al., 2019). It can be said that breeding technics with the free mating method continues to be widely used.

Table 2 Information about Mating Period

Hormone Use	**n**	**%**	**Mating type**	**n**	**%**
Yes	4	12.12	Free	28	84.85
No	29	87.88	Class	5	15.15
Flushing (female)			**Flushing (male)**		
Yes	16	48.49	Yes	11	33.33
No	17	51.51	No	22	66.67
Breeding period for sheep (years)			**Breeding period for ram (years)**		
2	1	3.03	4	3	9.09
3	5	15.15	6	13	39.4
4	11	33.33	7	11	33.33
5	4	12.12	10	6	18.18
6	9	27.28	**Number of sheep per ram (head)**		
7	3	9.09	20	9	27.28
Keeping Ram in Herd			25	12	36.36
Throughout the year	1	3.03	30	8	24.24
Mating season	32	96.97	35	0	0
			40	4	12.12

n: Number of CAM sheep breeders

It was determined that partial supplementary feeding was applied to rams and sheep before mating period. The rate of breeders giving additional feeding to rams was determined as 33.33% and sheep were 48.49%. Arıtunca and Karabacak (2019) reported in Konya province that they made additional feeding in 61.4% of the farms before mating season. In this study conducted in Ankara, it is thought that the difference in supplementary feeding of sheep and rams before mating is due to feed costs.

While the duration of using their animals for breeding varies in herd, it was determined that males were generally used as breeding for 4 and 6 years (33.33% and 27.28%), and females were used as breeding stock for 6 and 7 years (39.40% and 33.33%). In the study conducted by Tüfekci (2020) in Yozgat province and Gül et al. (2022) in Aksaray province, rams were respectively used for 2-3 and 2-4 years in herd. In addition, it was determined in study that the mating plan was generally calculated to include one ram for twenty five sheep (36.36%). This situation is similar to the study conducted by Aydın and Keskin (2018) in Muğla province.

Developmental characteristics of CAM lambs are given in Table 3. According to this chart, it was determined that the average lamb birth weight was between 3-4 kg (54.55%). In addition, while the rate of breeders with a birth weight between 2-3 kg was 39.39%, the birth weight of the lambs of 2 breeders was indicated between 4-5 kg in study.

Table 3 Information of Animals Growth Characteristics

Birth weight (kg)	**n**	**%**	**Suckling duration (month)**	**n**	**%**
2-3	13	39.39	2	3	9.09
3-4	18	54.55	3	30	90.91
4-5	2	6.06	**Feed practice time**		
90th day weight (kg)			1-14 days	6	15.15
30	7	21.21	15-30 days	22	66.67
35	15	45.46	30 days later	5	15.15
38	3	9.09			
39	1	3.03			
40	7	21.21			

n: Number of CAM sheep breeders

In addition, while the rate of breeders with a birth weight between 2-3 kg was 39.39%, the birth weight of the lambs of 2 breeders was indicated between 4-5 kg in study. It has been reported that the suckling time in the lambs was usually made for 3 months (90.91%). In the practice of eating habits, which is important for rumen development, a significant part of the breeders stated that they started giving forage and concentrated feed to the lambs from the age of 15 days (81.82%).

Table 4 shows information about ewe and lambs diet type. All of the breeders in study declared lamb fattening. The rate of those who fattened their lambs for 3 months was 33.33%, and the rate of those who fattened their lambs for 4 months was 54.55%. 72.73% of breeders said that they did not feed their animals additionally during the pasture period, the rate of those, gave additional feed depending on the condition of pasture, was calculated as 21.21%. Köseman et al. (2022) in Elazığ province reported that 55.4% of breeders did not give additional feed to their animals in pasture grazing period. Pastures are important feed sources in sheep breeding. It is thought that grazing time and seasonal conditions affect the grazing capacity and productivity of pastures.

Table 4 Lamb and Sheep Feeding Types (%)

Lamb fattening situation	**n**	**%**	**Pasture sufficiency status**	**n**	**%**
Yes	33	100	Sufficient	7	21.21
No	0	0	Insufficient	24	72.73
Lamb fattening duration (Months)			Partially sufficient	2	6.06
3	11	33.33	**Feeding method of sheep**		
4	18	54.55	Extensive	0	0
Others	3	12.12	Semi-intensive	33	100
Additional feeding during pasture period			Intensive	0	0
Yes	2	6.06	**Status of receiving support regarding animal nutrition**		
No	24	72.73	Yes	5	15.15
According to the grass condition in the pasture	7	21.21	No	28	84.85
Period of giving concentrated feed to sheep					
Before birth	29	87.88			
After birth	15	45.45			
Mating season	9	27.27			

n: Number of CAM sheep breeders

When asked about the pasture situation, it reported that pastures were inadequate (72.73%) for grazing. Seven breeders (21.21%) stated in study that pastures were sufficient. All of sheep breeders prefer semi-intensive feding. In addition, the number of breeders, receive support from experts about animal feeding topics, is very low (28 people - 84.85%). It was determined that the majority of breeders in study (87.88%) fed their animals before birth. Ceyhan et al. (2015) in their study in Niğde province,

reported that 89.6% of breeders gave supplementary feeding to their animals during gestation. It can be assumed that breeders are aware of the positive effects of feeding before birth on mother's milk, offspring survival and birth weight.

In the scope of study, Table 5 shows about information on feed sources, used in lamb and sheep feeding, in farms. It is seen that the majority of breeders (19 people) prefer alfalfa hay as a roughage source for lambs. All of breeders in study stated that they buy concentrate feed from factory. However, they also said to use grain feed such as wheat, oats and corn from time to time. It is thought that the differences in the feeding practices of farms originate from the current business situation, economic conditions and raw material supply.

Table 5 Raw Feeds Used for Sheep and Lamb Feeding

	Feeds		n	%
Lamb	**Roughage**	Alfalfa hay	19	57.58
		Meadow Grass	1	3.03
		Straw	5	15.15
		Vetch Grass	8	24.24
	Concentrated feed	Barley	7	21.21
		Concentrate	33	100
		Wheat	2	6.06
		Oat	4	12.12
		Corn	2	6.06
Sheep	**Roughage**	Alfalfa hay	22	66.67
		Meadow Grass	12	36.36
		Straw	18	54.54
		Silage	6	18.18
		Sainfoin	2	6.06
	Concentrated feed	Barley	29	87.87
		Corn	3	9.09
		Concentrate	21	63.63
		Wheat	17	51.51
		Oat	10	30.3
		Sugar Beet Pulp	3	9.09

n: Number of CAM sheep breeders

Breeders (22 people) in study preferred alfalfa hay as a roughage source in feeding their sheep, as in the case of lambs. In addition, they stated that they use wheat straw, vetch grass, silage and sainfoin as a source of roughage in feeding. The most of breeders buy concentrated feed from the factory to feed sheep. They use additionally barley (29 people), wheat (17 people), oats (10 people), corn (3 people) and sugar beet pulp in sheep feeding. Tüfekçi (2020) reported in Yozgat province that breeders used factory feed-barley-wheat as concentrated feed and also barley-wheat-lentils-chickpea straw-vetch grass as roughage. In different studies conducted on sheep farms, it was stated that the rate of using concentrated feed was 43.84% and the rate of using to own rations was as 32.88% (Gül and Örnek, 2019; Dellal et al., 2022). It is thought that the feed resources used by breeders are shaped according to climate, changes in crop production, animal breeding culture differences and feed prices.

96.97% of breeders in our survey have been involved in "National Project for Community-based Small Ruminant Breeding" for more than five years (Figure 4).

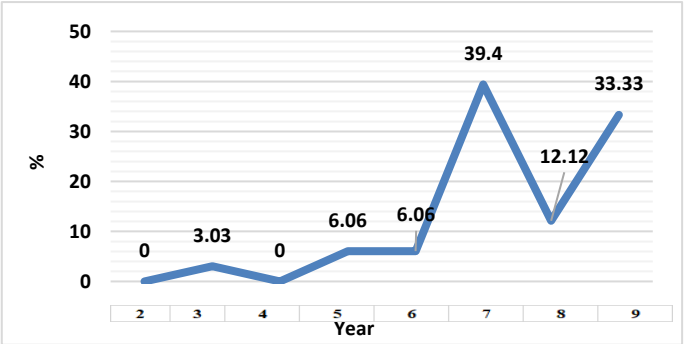

Figure 4 Duration of Farms in Breeding Projects (%)

The sheep breeders involved in study were asked thoughts on the breeding project and the answers received are given in Figure 5.

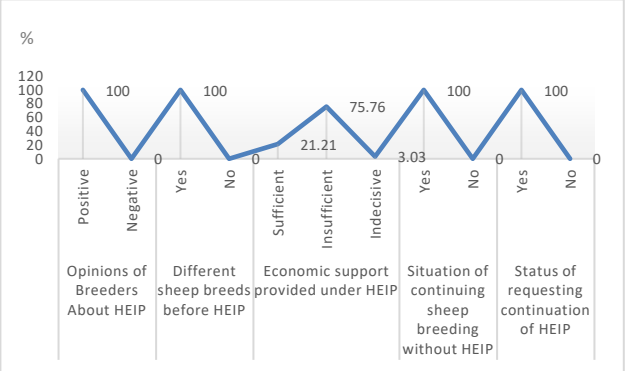

Figure 5 National Project for Community-based Small Ruminant Breeding (HEKIP)

According to the evaluations, all of the farmers (33 people - 100%) stated that they were satisfied with the project. However, they underlined also that the financial support provided within the scope of the project was insufficient (75.76%). While breeders stated that they would continue to breed sheep even if there was no project, they wanted to request the continuity of the project. It was said by the breeders that there were different sheep breeds in own herds before they were involved in the breeding project. However, they stated, removed different sheep breeds from the herd with breeding project. Information about these sheep is given in Figure 6.

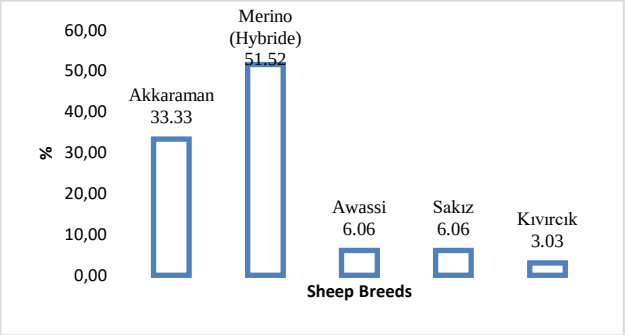

Figure 6 Different Sheep Breeds in Farms Before HEKIP (%)

As seen in Figure 6, there were mostly Merino hybrid (51.52%) and Akkaraman (33.33%) before entering the breeding project in farms.

In the survey, questions were asked about whether the breeding project had positive or negative any contribution to farms (Table 6). All of sheep breeders (100%) in study stated that there were positive changes in the infrastructure of farms. These effects include lamb deaths, birth and 90th day weights, multiple births, hygiene and care-feeding.

Conclusion

National breeding project carried out in different provinces in Türkiye are successfully applied. There are important positive outcomes for the breeders and country's economy in this project. In this context, the breeding project carried out for CAM breed was evaluated and the results were presented.

It has been observed that breeders, whose are breeding CAM sheep in Ankara region, have high experience in this field. However, they have low level of education. Therefore, it would be beneficial to increase education levels about modern animal husbandry. For this purpose, it will be useful to organize courses on the subject, issue certificates and give extra incentives to breeders with certificates. Insufficiency of pastures is one of the main problems. Improving pastures will have a positive impact on reducing production costs. Increasing the financial support provided to the project and purchasing the livestock produced by the breeders within the scope of the project at a value price will be an important step in terms of the effectiveness and sustainability of the project. As a result, it has been determined that all breeders within the project are extremely satisfied with the breeding project, and that thanks to the project, significant developments have occurred in them both financially and scientifically.

The limitations of the study are that farms operating in some districts of only one province of Turkey were selected. Additionally, these farms are included in the breeding project carried out in Ankara province. The contribution of this study to future studies may shed light on the examination of the feeding, care and cultivation methods of existing farms and the effects of the applied breeding project on the farms.

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References

Aydın MK, Keskin M (2018): Muğla ilinde küçükbaş hayvan yetiştiriciliğinin yapısal özellikleri. Mediterranean Agricultural Sciences, 31 (3), 317-323

Aritunca D, Karabacak A (2020): Konya merkez ilçelerinde koyunculuk işletmelerinin durumu. Bahri Dağdaş Hayvancılık Araştırma Dergisi, 9 (1), 13-24

Behrem S, Keskin M (2013): Kilis ilinde keçi yetiştiriciliğinin mevcut durumu. MKU Ziraat Fakültesi Dergisi, 18 (2), 69-72

Ceyhan A, Şekeroğlu A, Ünalan A, Çınar M, Serbester U, Akyol E, Yılmaz E (2015): Niğde ili koyunculuk işletmelerinin yapısal özellikleri ve sorunları üzerine bir araştırma. KSÜ Doğa Bil Derg, 18 (2), 60-68

Demir PA, Işık SA, Aydın E, Yazıcı K, Ayvazoğlu C (2015): Ardahan ilinde koyun yetiştiriciliğinin sosyoekonomik önemi, Van Veterinary Journal, 26 (3), 141-146

Dellal İ, Keskin G, Dellal G (2002): GAP bölgesinde küçükbaş hayvan yetiştiren işletmelerin ekonomik analizi ve hayvansal ürünlerin pazara arzı. TEAE, Yayın No: 83, Ankara

Gül S, Görgülü Ö, Keskin M (2009): Adana ili Feke, Saimbeyli ve

Tufanbeyli ilçelerinde küçükbaş hayvan yetiştiriciliğinin durumu. MKU Ziraat Fakültesi Dergisi, 14 (1), 29-34

Gül S, Örnek H (2018): Gaziantep ilinde küçükbaş hayvan yetiştiriciliğinin yapısal özellikleri I. Koyun Yetiştiriciliği. Mustafa Kemal Üniversitesi Ziraat Fakültesi Dergisi, 23 (2), 306-314

Gül S, Örnek H (2019): Gaziantep ilinde küçükbaş hayvancılığın yapısal özellikleri: II. Keçi Yetiştiriciliği. Journal of Animal Production, 60, 89-96

Gül S, Oflaz NZ, Keskin M, Behrem S (2022): Aksaray ilinde koyun yetiştiriciliğinin yapısal özellikleri. Erciyes Tarım ve Hayvan Bilimleri Dergisi, 5 (2), 1-11

Köseman A, Şeker İ, Selim KUL, Karaca M (2022): Elazığ ilindeki koyunculuk işletmelerinde sürü yapısının ve yetiştiricilik uygulamalarının araştırılması. Kahramanmaraş Sütçü İmam Üniversitesi Tarım ve Doğa Dergisi, 25, 555-565

Ordu M, Zengin Y (2020): A comparative forecasting approach to forecast animal production: A case of Turkey. Livestock Studies, 60 (1), 24-31

Özsayın D, Everest B (2019): Koyun yetiştiriciliği yapan üreticilerin sosyo-ekonomik yapısı ve koyunculuk faaliyetiyle ilgili uygulamaları. KSÜ Tarım ve Doğa Dergisi, 22, 440-448

Özyürek S, Türkyılmaz D, Dağdelen Ü, Esenbuğa N, Yaprak M (2018): Erzincan ili koyunculuk işletmelerinin yapısal özellikleri ve sorunlarının işletme büyüklüğüne göre incelenmesi. Akademik Ziraat Dergisi, 7 (2), 219-226

Tüney Bekek D, Keskin M (2018): Mersin ilinde koyun yetiştiriciliğinin mevcut durumu bazı verim ve yapısal özellikleri. Journal of Agricultural Faculty of Mustafa Kemal University, 23 (2), 315-323

Tüfekçi H (2020). Yozgat ili küçükbaş hayvan yetiştiriciliğinin yapısal durumu ve geliştirme olanaklarının belirlenmesi. J Anim Prod, 61 (1), 91-10