Black Sea Journal of Agriculture
doi: 10.47115/bsagriculture.990619

Open Access Journal
e-ISSN: 2618 – 6578

Research Article
Volume 4 - Issue 4: 133-136 / October 2021

THE EFFECTS OF DIFFERENT ORGANIC FEED ON THE REPRODUCTIVE PERFORMANCE OF KARAYAKA SHEEP

Ceyhun YÜCEL[1]*, Numan KILIÇALP[2]

[1]*Gaziosmanpaşa University, Graduate Education Institute, Organic Agriculture Program, Taşlıçiftlik Campus, 60000, Tokat, Turkey*
[2]*Gaziosmanpaşa University, Faculty of Agriculture, Department of Animal Science, Taşlıçiftlik Campus, 60000, Tokat, Turkey*

Abstract: This research was carried out to investigate the effects of different organic feeds (1. Traditional barley (control), 2. Organic barley (OB), 3. Organic triticale (OT)) and 4. Organic corn (OC) on reproductive performance in Karayaka sheep. Trial feeds were given from 21 days before the mating with rams to 10 days after the rams were added in the pasture period of the sheep. The animals used in the experiment were 3-4 years old, their average live weight was 56±0.5 kg and 10 heads in each trial group, a total of 40 Karayaka sheep has been carried out. The highest fertility rate in sheep was in the organic triticale group; followed by control, organic barley and organic corn (P=0.06). According to these results, the highest lamb yield was obtained from the organic triticale group.

Keywords: Karayaka, Organic sheep feeding, Reproductive performance, Fertility

***Corresponding author:** Gaziosmanpaşa University, Graduate Education Institute, Organic Agriculture Program, Taşlıçiftlik Campus, 60000, Tokat, Turkey
E mail: ceyhun_356@hotmail.com (C. YÜCEL)
Ceyhun YÜCEL https://orcid.org/0000-0002-1978-9051
Numan KILIÇALP https://orcid.org/0000-0003-1359-9369

Received: September 03, 2021
Accepted: September 15, 2021
Published: October 01, 2021

Cite as: Yücel C, Kılıçalp N. 2021. The effects of different organic feed on the reproductive performance of Karayaka sheep. BSJ Agri, 4(4): 133-136.

1. Introduction

The purpose of organic agriculture is to establish systems within the concept of "functional integrity" based on soil-plant, plant-animal and animal-soil interdependence and a sustainable agro ecological local resources (Thompson and Nardone, 1999). Organic production systems are based on native animal breeds that contribute to the ecological cycle, have developed local and regional adaptation, are resistant to diseases, use natural forage resources such as meadows, pastures and plateaus, and increase and protect biological diversity in every sense organic sheep breeding within organic sheep and goat farming is showing a growing trend in Europe (FAO, 1999). The number of organic dairy sheep farms is increasing in Mediterranean countries and Northern Europe. Yavuzer and Bengisu, (2015) stated that there is a form of breeding that is not far from organic livestock rules in the field of extensive sheep breeding, which is applied in various countries, especially in the Mediterranean countries. It has been reported that the Mediterranean climate zone has not been treated with artificial fertilizers and chemicals, and is not used for other agricultural activities other than grazing. In this respect, it has been argued that extensive sheep and goat production systems are closer to the organic system and can transition from the conventional system to the organic system more easily (Koyuncu and Taşkın, 2013). In addition, in a study investigating the possibilities of lambing twice a year without applying hormones in the organic livestock system, it was determined that an increase of 40% in pregnancy rate and 40-44% in lamb yield was achieved in Awassi sheep (Yavuzer, 2005).

This study was carried out to investigate the effects of some organic feeds on reproductive performance in Karayaka sheep.

2. Material and Methods

2.1. Research Site and Climate Characteristics

The research was carried out on the Akbelen plateau in the north, at 40°26'42" latitude, 36°40'53" longitude (east) coordinates, connected to the center of Tokat. The long-term average annual temperature and precipitation data of this region are 12.6 °C and 431.7 mm, respectively (MGM, (2017). The grazing pasture is 1679 m above sea level, covered with slightly inclined (20-30%), clayey, salty and slightly acidic, non-calcareous, brown forest soils.

2.2. Animal Material

In this study, 40 Karayaka sheep, 3-4 years old, with an average live weight of 56±0.5 kg, were randomly distributed into 4 groups, with 10 sheep and 1 head ram in each experimental group. Concentrated feeds were prepared isocalorically and isonitrogenically in Yazıcıoğlu feed processing unit (NRC, 2001).

2.3. Trial Feeds

With grazing, the experimental groups were fed with 600 g of concentrated feed per day, starting 21 days before mating and until 10 days after mating, and the mineral substance requirement of the experimental animals was met from organic rock salt NRC (2001) (Table 1, Table 2).

Table 1. Feed raw materials used in the experimental groups

Feed raw materials	Control (%)	Organic barley (%)	Organic triticale (%)	Organic corn (%)
Conventional barley	60			
Conventional grain vetch	29			
Conventional corn	10			
Rock salt	1	1	1	1
Organic barley		60		5
Organic grain vetch		29	24	34
Organic corn		10	10	60
Organic triticale			65	
	100	100	100	100
Organic alfalfa dry grass		Ad –libitum	Ad –libitum	Ad –libitum
Conventional alfalfa dry grass	Ad –libitum			
ME Mcal, kg^{-1}	2.63	2.63	2.66	2.67
Crude protein (%)	16.32	16.32	16.37	16.12

Table 2. Feed raw materials and chemical compositions

Feed raw materials / chemical ingredients	DM (%)	OM (%)	CP (%)	CF (%)	NDF (%)	ADF (%)	CA (%)	TDN g/100g
Conventional barley	88.91	85.54	12.44	2.41	18.44	7.13	3.37	81.70
Conventional grain vetch	88.30	82.85	28.02	0.82	15.05	13.79	5.45	76.80
Conventional corn	87.38	86.25	7.21	2.89	8.63	3.14	1.13	84.80
Organic barley	89.01	85.39	11.25	2.39	19.78	7.01	3.62	80.60
Organic grain vetch	89.15	85.86	29.76	0.77	10.75	9.34	3.29	80.50
Organic corn	87.18	85.92	8.76	4.61	7.62	3.42	1.26	86.5
Organic triticale	88.48	86.77	10.80	1.50	12.35	3.58	1.71	82.60
Organic alfalfa dry grass	92.89	86.84	14.28	0.38	63.28	54.05	6.05	47.90
Conventional alfalfa dry grass	92.82	85.06	12.21	0.93	61.92	48.04	7.76	46.01
Pasture grass	90.06	80.66	16.24	1.12	46.91	24.35	9.40	56.78

DM= dry matter, OM= organic matter, CP= crude protein, CF= crude fat, NDF= neutral detergent fiber, ADF= acid detergent fiber, CA= crude ash, TDN= total digestible nutrients.

2.4. Botanical Composition of Pasture

The composition of the forage plants that make up the pasture composition was determined by harvesting the plants from the pasture area. A metal circle with a diameter of 0.25 m^2 was randomly placed in different parts of the pasture where the animals grazed, and the pasture plants falling on an area of 0.25 m^2 from each of the 4 repeated plots were harvested with the help of scissors. Pasture plants were harvested 5 cm above ground level. The pasture where the experiment was carried out, 51% of which was grasses; *Festuta ovina*, *Fescuta pratenses*, *Poa pratensis*, *Poa bulbosadan*, *Dactylis glomerata* 14.06% are from legumes (*Trifolium repens*, *Potarium Sanguisorba*, *Trigonella foenum-graecum*, *Lotus corniculatus*) and 34.94% are from other species (*Trifolium repens*, *Potarium Sanguisorba*, *Lotus corniculatus* officinale, *Ranunculus asiaticus*, *Gazania rigens*) found to be covered. It is defined as a middle class pasture in the pasture classification.

2.5. Fertility Characteristics

Number of sheep under ram (head); The total number of sheep in mating ability, Pregnancy rates (%); Number of sheep giving birth/Number of sheep under Aries*100, Twinning ratio; Number of twin lambs/Total number of lambs born*100, Single born lamb rates (%); Number of single born lambs/Total number of lambs born*100, Prolificacy rates (%); Total number of lambs born/Number of sheep under ram*100, Total number of lambs born (head); It refers to all lambs born, Number of sheep giving birth; Number of sheep that conceived and gave birth, Falling number of lambs per ewe (head); Total number of lambs born/Number of sheep under ram*100.

2.6. Chemical Analysis

Green fodder samples from the pasture were dried at 70°C for 48 hours, ground and passed through a 1 mm sieve to determine the chemical composition. In addition, pasture samples were burned at 525°C for 8 hours to detect organic matter and raw ash. The crude protein

(CP) content of the feeds was determined by the Kjeldahl method using the Tecator Block fractionation and steam distillation method (total N multiplied by 6.25). Acid detergent fiber (ADF) and neutral detergent fiber (NDF) contents of feed samples, AOAC (2012) by ANKOM fiber analyzer (F220/220 Operator's Manual, Ankom tech.) with the filter bag method. Total digestible nutrients were calculated according to the specified equations. Forage TDN = 0.479 NDF + 0.704 NFC + 1.594 EE + 0.714 CP. Concentrate TDN = 0.323 NDF + 0.883 NFC + 1.829 EE + 0.885 CP (Jayanegara et al., 2019).

2.6. Statistical Analysis

χ^2 (Chi-square) independence test was applied to investigate whether there was a difference between the experimental groups in terms of reproductive performance of sheep (Harvey, 2009; Önder, 2018).

3. Results and Discussion

Fertility performances of feed groups containing traditional and different organic energy feeds in Karayaka sheep, when the fertility rates of the different groups given in Table 3 and Figure 1 are examined; although it is not statistically significant, it was observed that it was the lowest in the organic corn group and all organic triticale and control group sheep kept offspring.

Table 3. Effects of different organic feeds on the reproductive performance of sheep

Fertility Properties	Control	Research groups			P value
		Organic barley	Organic triticale	Organic corn	
Number of sheep under ram (head)	10	10	10	10	
Pregnancy rates (%)	100	90	100	70	0.084
Prolificacy rates (%)	100	90	110	70	0.061
Twinning ratio (%)	0	0	18	0	0.400
Single born lamb rates (%)	100	100	82	70	0.099
Total number of lambs born (head)	10	9	11	7	
Falling number of lambs per ewe (head)	1.00	0.90	1.10	0.70	0.061

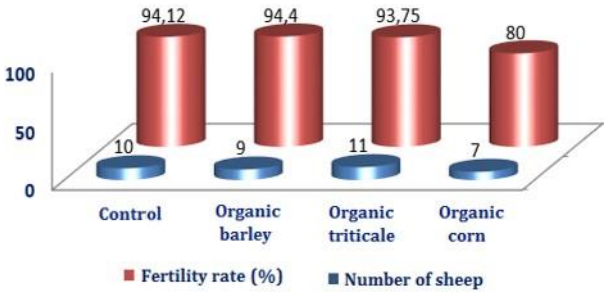

Figure 1. Fertility rates and the number of sheep giving birth (head).

Sauer et al. (2017) stated that they found the pregnancy rates in organic and traditionally raised Turcana sheep to be 97.94% in organically reared and 94.72% in conventionally bred sheep. In addition, in the study of Palacios and Abecia (2017), it was stated that the fertility rate in sheep fed with organic feed was higher than in those using hormones. In this study; the highest fertility rate in sheep was in the organic triticale group; followed by control, organic barley and organic corn (P=0.06). According to these results, lamb yield was obtained from the highest organic triticale group. Similarly, Sauer et al. (2017), in their study in Turcana sheep, stated that the fertility rates were 118.18% in organic production and 110.16% in traditional production. When Table 3 is examined in terms of twinning, there were no sheep that gave birth to twins except the organic triticale group, while 18% twinning rate was obtained in the triticale group, but the statistical difference between the groups was not significant. In addition, in the study of Bilik and Rusek (2010) on dairy cattle; they stated that there is no difference in fertility in cows fed with organic and conventional feeds. In terms of the number of lambs per ewe, it was observed that the number of lambs per organic triticale group was higher than the other experimental groups (P=0.06). As a result, it is thought that the use of triticale in concentrated feed of sheep will be an advantage in organic sheep breeding.

Author Contributions

All authors had equal contributions and all authors reviewed and approved the manuscript.

Conflict of Interest

The authors declare that there is no conflict of interest.

Ethical Consideration

This study, was carried out by Gaziosmanpaşa University Animal Experiments Local Ethics Committee with the approval of Animal Experiments Protocol (Protocol No: 2019-HADYEK-24) dated 07.11.2019 and numbered 51879863-229.

Acknowledgements

This article is derived from Ceyhun YÜCEL's doctoral thesis titled "The Effects of Organic Feed on Some Yield Traits in Different Physiological Periods of Karayaka Sheep".

References

AOAC. 2012. Official Methods of Analysis. AOAC International,

Arlington, VA, USA, 19th ed., pp. 771.

Bilik K, Rusek M. 2010. Effect of organic and conventional feding of Red-and-White cows on productivity and milk composition. Ann Anim Sci, 10(4): 441–458.

FAO. 1999. Food and Agriculture Organisation of the United Nations, Organic Agriculture. 15th Session of the Committee on Agriculture, 25-29 January, Rome, Italy, pp. 254.

Harvey KLL. 2009. SPSS Survival Manual: A step-by-step guide to data analysis using SPSS version 15. Nurse Res, 16(3): 89-90.

Jayanegara A, Ridla M, Astuti DA, Wiryawan KG, Laconi EB, Nahrowi A. 2017. Determination of energy and protein requirements of sheep in Indonesia using a metaanalytical approach. Media Peternakan, 40: 118-127.

Koyuncu M, Taşkın T. 2013. Ecological sheep and goat breeding. Ed.Ak I. Animal Husbandry in Ecological-Organic Agriculture. Dora-Basım Publishing Distribution Ltd. Sti., Bursa, Turkey, ISBN: 978-605-4798-46-9, 1th ed., pp: 228,

MGM. 2017. General directorate of meteorology. Ankara, Turkey https://www.mgm.gov.tr/ (accessed date: March 23, 2021).

NRC. 2001. Nutrient requirements of sheep. National Academy Press Washington, DC, USA, 7th ed, pp 128.

Onder H. 2018. Nonparametric statistical methods used in biological experiments, BSJ Eng Sci, 1(1): 1-6.

Palacios C, Abecia JA. 2017. Towards a sustainable reproductive sheep management: Use of photoperiod-treated rams to increase lamb production in an organic farm, J Dairy Vet Sci, 1(2): ID.555558.

Sauer M, Dragomir N, Padeanu I, Gavojdian D, Sauer IW, Voia SO. 2017. Effects of production system on reproduction efficiency in dairy sheep. Anim Sci Biotech, 50(2):122-125.

Thompson PB, Nardone A. 1999. Sustainable livestock production: methodological and ethical challenges. Livest Prod Sci, 61: 111-119.

Yavuzer Ü, Bengisu G. 2015. Organic livestock. Publication No: 1202. Food, Agriculture and Livestock No: 101. Nobel Akademik Yayıncılık Eğitim Danışmanlık Tic. Ltd. Sti., İstanbul, Turkey. ISBN: 978-605-320-106-9, 1th ed., pp: 117.

Yavuzer Ü. 2005. The possibilities of twice-yearly lambing of awassi sheep ewes without using hormones in an organic animal production system. Turk J Vet Anim Sci, 29: 27-30.