Journal of Animal Science and Products (JASP)
International peer-reviewed journal
5 (1): 1-6, 2022

# A Study on Relationships Between Different Udder Measurements and Milk Yield Characteristics in Awassi Sheep

**Pınar KUTAN[1], Mahmut KESKİN*[2]**

[1]Hatay Mustafa Kemal Üniversitesi, Fen Bilimleri Enstitüsü, Zootekni Anabilim Dalı, 31034, Hatay, Türkiye
[2]Hatay Mustafa Kemal Üniversitesi, Ziraat Fakültesi, Zootekni Bölümü, 31034, Hatay, Türkiye

Pınar KUTAN, ORCID No: 0000-0001-7694-0486, Mahmut KESKİN, ORCID No: 0000-0002-8147-2477

**ARTICLE INFO**

**Research Article**

*This manuscript has been prepared as part of a MSc thesis entitled as "Relationships between Different Body Characteristics and Yield Characteristics in Awassi Sheep"*

Received : 18.01.2022
Accepted : 14.02.2022

**Keywords**

Small ruminant
Awassi
Udder
Teat
Milk

*** Corresponding Author**
mkeskin@mku.edu.tr

**ABSTRACT**

This study was carried out to determine the phenotypic corelations between different udder sizes and marketable milk yield in Awassi sheep. The animal material of the study consisted of primiparous vs multiparous sheep. Marketable milk yield and udder sizes were determined after weaning in sheep. The correlations between the examined features were calculated with the SPSS package program. At the end of the study, positive and significant (P<0.05 and P<0.01) correlations were calculated between teat length, teat circumference and udder width over the teat, and marketable milk yield. It has been evaluated that these correlations can be used in the selection of the breeding stocks.

# İvesi Koyunlarında Meme Ölçüleri ile Süt Verimi Arasındaki İlişkilerin Belirlenmesi Üzerine Bir Araştırma

**MAKALE BİLGİSİ**

**Araştırma Makalesi**

*Bu çalışma "İvesi Koyunlarında Farklı Vücut Özellikleri ile Verim Özellikleri Arasındaki İlişkiler " başlıklı yüksek lisans tezinden hazırlanmıştır*.

Geliş: 18.01.2022
Kabul: 14.02.2022

**Anahtar Kelimeler**

Küçükbaş
İvesi
Meme
Meme başı
Süt

*** Sorumlu Yazar**
mkeskin@mku.edu.tr

**ÖZET**

Bu çalışma İvesi koyunlarında değişik meme ölçüleri ile pazarlanabilir süt verimi arasındaki fenotipik ilişkilerin belirlenmesi amacı ile yapılmıştır. Çalışmanın hayvan materyalini ilk doğumunu yapan yada iki veya daha fazla doğum yapan koyunlar oluşturmuştur. Koyunlarda sütten kesim sonrası pazarlanabilir süt verimi ve meme ölçüleri belirlenmiştir. İncelenen özellikler arasındaki korelasyonlar SPSS paket programı ile belirlenmiştir. Deneme sonunda meme başı uzunluğu, meme başı çevresi ve meme başı üzerinden meme genişliği ile pazarlanabilir süt verimi arasında pozitif ve önemli (P<0.05 ve P<0.01) korelasyonlar hesaplanmıştır. Bu korelasyonların damızlık hayvan seçilmesinde kullanılabileceği değerlendirilmiştir.

**Lütfen aşağıdaki şekilde atıf yapınız / Please cite this paper as following;**
Kutan, P., Keskin, M., 2022. A study on relationships between different udder measurements and milk yield characteristics in Awassi Sheep, Journal of Animal Science and Products (JASP) 5 (1): 1-6. DOI: 10.51970/jasp.1059540

## Introduction

Awassi sheep, which is one of the indigenous sheep breeds in Turkey, is a breed that has a good milk yield and also a good fattening ability. Lactation milk yield has been reported between 80 kg and 350 kg in different studies for Awassi sheep. This sheep is bred widely in Gaziantep, Şanlıurfa, Adana and Hatay provinces of Turkey, which have a hot and dry climate in summers (Kaymakçı and Sönmez, 1996; Biçer et al., 2019; Gül and Oflaz, 2021).

Global climate change and the decrease in water resources make domestic gene resources such as Awassi sheep, which can be reared in extensive or semi-intensive conditions in the livestock sector, more preferable. However, breeding of the genotypes by selection is important also for rearing with local genotypes. In this context, based on our nearly 20 years of field experience, we can say that although large enterprises can carry out animal breeding studies based on accurate and reliable records, small-scale enterprises choose their breeding stocks using traditional methods by the experience of the breeders.

Since the number of farms keeping records is limited in sheep breeding in Turkey, subjective criterias rather than objective criterias are taken into account in the selection of breeding stocks at the local farms or in purchase of new animals for the flocks. The relations between the different characteristics of the animal and the yield trait that is being tried to be improved can be used in the selection of breeding animals with subjective criteria (Özcan and Torun, 1990; Tilki and Keskin, 2021).

One of the features that may be related to milk yield is different udder characteristics. In different studies conducted with different sheep breeds, it has been reported that there are relationships between some udder sizes and milk yield characteristics (Afolayan et al., 2006; Shirzeyli et al., 2013; Özyürek, 2020). In this study, the relationships between different udder sizes and marketable milk yield were investigated in Awassi sheep.

## Materials and Methods

The animal material of the study consisted of a total of 41 Awassi sheep, which were primiparous (15 heads) and were multiparous (26 heads) in a private farm reared in the Polateli district of Kilis. After birth, ewes were given 500 g/day per animal of concentrate feed containing 2400-2600 kcal ME and 15-16% crude protein, in addition to pasture. The lambs were weaned at the age of 60 days and after weaning, individual milk were recorded once every 28 days in the morning milking. At the same day total milk yields were taken in the evening. Milk yields of the ewes were calculated as marketable milk yield according to the Flechman method within the scope of the ICAR - AT method used also by Tilki and Keskin (2021).

Udder length (A), udder width (B), udder circumference over the teats (C), distance between teats (D), teat diameter (E), teat length (F) and teat-knee distance were determined by measuring tape and calliper tool from ewes that gave birth (Figure).

Correlations between different features were calculated with SPSS package program (SPSS, 2013).

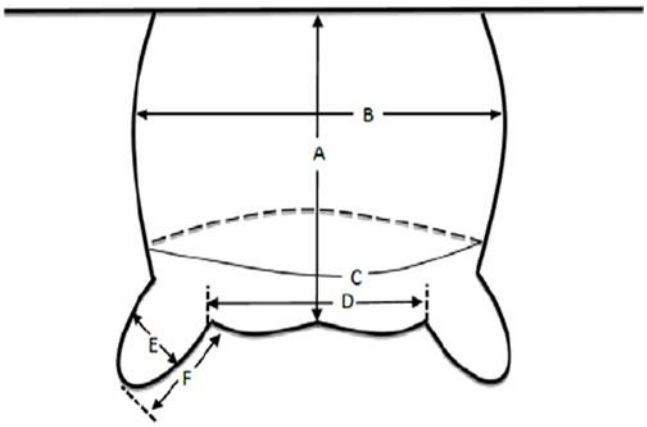


Figure. Udder and teat measurements (Türkyılmaz et al., 2018)
*Şekil. Meme ve meme başı ölçümleri (Türkyılmaz ve ark., 2018)*

**Results and Discussion**

Marketable milk yield calculated from experimental ewes is given in Table 1. From this table, it is seen that the birth number does not affect the marketable milk yield and the average marketable milk yield is calculated as 76.6 liters. Lactation milk yield was reported as 176.6 kg in a study conducted with Awassi sheep in Ceylanpınar Agricultural State Farm by Yıldız and Yıldız (2002). Kaygısız and Dağ (2017) reported 241-255 liters in another study. The lower milk yield detected in the current study may be due to the fact that the animals in the Ceylanpınar Agricultural State Farm, where other studies were carried out, have been subject to selection for years and better management and feeding conditions at this state farm. The marketable milk yield value obtained in the current study is also lower than the marketable milk yield (117.4 kg) reported for Awassi sheep in a study conducted in Gaziantep province (Gül and Oflaz, 2021). The fact that the pasture conditions differ from year to year or from village to village due to seasonal changes in these extensively reared animals may affect these results.

Table 1. Effect of birth number on marketable milk yield (liter)
*Tablo 1. Doğum sayısının pazarlanabilir süt verimi üzerine etkisi*

| Birth number | n | Mean | Standard error |
|---|---|---|---|
| Primiparous | 15 | 75.9 | 4.40 |
| Multiparous | 26 | 77.0 | 5.16 |
| P | | >0.05 | |
| Total | 41 | 76.6 | 3.61 |

The relationships between different udder sizes determined for the experimental animals and marketable milk yield are given in Table 2.

Table 2. Correlation coefficients between some udder/teat sizes and marketable milk yield
*Tablo 2. Meme/meme başı ölçüleri ve pazarlanabilir süt verimi arasındaki korelasyon katsayıları*

| | TD | UCT | DT | UL | UW | TKD | MMY |
|---|---|---|---|---|---|---|---|
| TL | 0.865** | 0.467** | -0.281 | 0.399* | -0.298 | -0.716** | 0.382* |
| TD | 1 | 0.404** | -.0295 | 0.254 | -0.392* | -0.680** | 0.454** |
| UCT | | 1 | 0.004 | 0.288 | 0.122 | -0.357* | 0.443** |
| DT | | | 1 | -0.080 | 0.624** | 0.316* | -0.096 |
| UL | | | | 1 | 0.013 | -0.574** | 0.175 |
| UW | | | | | 1 | 0.324* | -0.139 |
| TKD | | | | | | 1 | -0.456** |

TL, teat lenth; TC, teat diameter; UCT, udder circumference over teats; DT, distance between teats; UL, udder length; UW, udder width; TKD, distance between teat and knee; MMY, marketable milk yeield; *, P< 0.05; **, P< 0.01

As can be seen from this table, they were calculated positive and significant correlations between the teat length, the teat diameter, the udder circumference over the teats and the distance between teat and knee (P<0.01). Positive and significant correlations were also calculated between the marketable milk yield and the teat length (P<0.05), the teat circumference (P<0.01) and the udder circumference over the teats (P<0.01). On the other hand, a negative and significant correlation was calculated between the teat-knee distance and marketable milk yield. Similar relationships have been reported in various studies with different sheep breeds. In a study conducted with Akkaraman sheep by Dağ (2000), significant relationships were reported between milk yield and udder circumference, teat length and udder height as similar to the present study. Kominakis et al. (2009) reported a positive relationship milk yield and some udder characteristics for sheep. In another study, Sarı et al. (2015) reported that there was a positive correlation between the number of lactations and udder circumference, udder depth, and lower and upper udder heights in Tuj sheep. Idowu et al. (2017) reported significant relationships between different breast characteristics (body length, udder width, udder length, distance between teats, teat circumference). Acros et al. (2020) also reported that there are significant relationships between udder circumference, udder length, udder width, udder volume and milk yield in Pelibuey sheep

## Conclusions

Positive and significant correlations were determined between marketable milk yield and teat length, teat circumference and udder width over teats in Awassi sheep. In addition, negative and significant correlation was determined between marketable milk yield and the distance between the teat and the knee. It was concluded that these correlations can be taken into account in the evaluation of animals as breeding stock.

## Acknowledgments

This manuscript has been prepared as part of a MSc thesis entitled as "Relationships between Different Body Characteristics and Yield Characteristics in Awassi Sheep". The authors would like to thank HMKU Coordinatorship of Scientific Research Projects (Project No: 19.YL.015) which provides financial support to the study.

## References

Afolayan, R.A., Adeyinka, I.A., Lakpini, C.A.M., 2006. The estimation of liveweight from body measurements in Yankasa sheep. Czech Journal of Animal Science. 51(8): 343–348

Arcos, D.A, Canul-Solis, J.,García-Herrera, R., Sarmiento-Franco, L., Piñeiro-Vazquez, A., Casanova-Lugo, F., Tedesch,. L., Gonzalez-Ronquillo, M., Chay-Canul, A., 2020. Udder measurements and their relationship with milk yield in Pelibuey ewes. Animals. 10(518): 1-9.

Biçer, O., Keskin, M., Gül, S., Gündüz, Z., Oflaz, N.Z., Behrem, S., 2019. Kahverengi ve siyah başlı İvesi koyunlarının verim özellikleri yönünden karşılaştırılması. Mustafa Kemal Üniversitesi Tarım Bilimleri Dergisi. 24(1): 58-61

Dağ, B., 2000. Akkaraman koyunlarında meme ölçüleri ile süt verimi arasındaki ilişkiler. Hayvancılık Araştırma Dergisi. 10(1-2): 39-42.

Gül, S.,Oflaz, N.Z., 2021.Gaziantep ve Kilis illerinde yetiştirilen İvesi koyunlarının bazı morfolojik ve fizyolojik özellikleri bakımından karşılaştırılması. Tekirdağ Ziraat Fakültesi Dergisi, 18 (1):146-156.

Idowu, S.T., Adewumi, O.O., Tona, G.O., 2017. Therelationship amongdam's milk parameters, weight, udder parameters and linear body measurements in West African Dwarf sheep at first lambing. Journal of Animal Sciences and Livestock Production. 1(1): 1-4.

Kaygısız, A., Dağ, B., 2017. Elit İvesi koyunlarında meme tipinin ve bazı çevre faktörlerinin süt verimine etkisi. KSÜ Doğa Bilimleri Dergisi. 20(4): 344-349.

Kaymakçı, M., Sönmez, R., 1996. İleri Koyun Yetiştiriciliği, 1. Baskı. Ege Üniversitesi Basımevi. 365 s. İzmir.

Kominakis, A.P., Papavasiliou, D., Rogdakis, E., 2009. Relationships among udder characteristics milk yield and non-yield traits in Frizarta dairy sheep. Small Ruminant Research, 84: 82-88.

Özcan, L., Torun, O., 1990. Hayvan Yetiştirme. Çukurova Üniversitesi Ziraat Fakültesi Ders KitabıNo: 112, Adana.

Özyürek, S., 2020. Investigation of Relationship between Udder Morphology, Lactation Traits and Milk Components in Morkaraman and Awassi. Gümüşhane Üniversitesi Fen Bilimleri Enstitüsü Dergisi, 10(1): 268-274

Sarı, M., Yılmaz, İ., Önk, K., 2015. Effects of lactation stage, lactation order and udder types on udder traits and composition of milk in Tuj ewes. Ankara Üniversitesi Veteriner Fakültesi Dergisi. 62: 313-318.

Shirzeyli, F.H., Lavvaf, A., Asadi, A., 2013. Estimation of body weight from body measurements in four breeds of Iranian sheep. Songklanakarin J. Sci. Technol., 35(5): 507-511.

SPSS, 2013. IBM SPSS Statistics 22.0 for Windows. Armonk, NY.

Tilki, H.Y., Keskin, M., 2021. Relationships between different body characteristics and milk yield traits in Kilis goats. Mustafa Kemal University, Journal of Agricultural Sciences, 26(2):272-277

Türkyılmaz, D., Özyürek, S., Esenbuğa, N., Yaprak, M., 2018. Correlation between various udder measurements and milk components in Morkaraman, Tuj and Awassi sheep. Pakistan Journal Zoology, 50(5):1921-1927.

Yıldız, A., Yıldız, N., 2002. Ceylanpınar Tarım İşletmesi'nde yetiştirilen İvesi koyunlarının süt verimi ve laktasyon süresi. YYÜ Veteriner Fakültesi Dergisi. 13(1-2): 117-121.