

## IMPACT OF AGE AND GENDER ON HEAD MEASUREMENTS OF MALYA SHEEP

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### Abstract

This experimental research was carried out with Malya sheep to determinate the effects of age and gender on head measurements. Head measurements were taken from 55 male and 261 female sheep from 1 year-old to 5 or more years-old. Head length, head circumference, head width, distance between ears, ear length and ear width were estimated as head measurements. The least squares method was used to investigate effects of age and gender on these traits. The least squares method was performed using the General Linear Model (GLM) procedure in Minitab package program for statistical analysis. The means of important subgroups as statistic were compared by using Duncan's multiple range tests. The least squares for head length, head circumference, head width, distance between ears, ear length and ear width were estimated as 32.59±0.17 cm, 49.00±0.18 cm, 13.06±0.07 cm, 20.48±0.10 cm, 15.44±0.10 cm and 8.64±0.04 cm, respectively. The effect of age and gender on all head area measurements were significant ( $P<0.05$ ) except for the effect on ear length. It can be said that all head area measurements increased significantly with increasing age and males have anatomically bigger head region measurements than females except for ear length. Having shorter ear measurements of males than females in some age groups can be caused by the big individual differences within Malya breed sheep, which was obtained as a result of combined crossbreeding.

*Key words:* crossbreed Merino sheep, Malya breed, least squares method, head measurements, female and male sheep, head area measurements

### Introduction

To improve the yield level of domestic sheep after the declaration of the Republic of Turkey, backcrossing studies were done with Deutsches Merinofleischschaf rams. Meat and wool yield increased with increasing of Merinos genotype in herds at Konya province and successful results were obtained (Müftüoğlu, 1968). Merino has still been successfully bred in Middle Anatolia and similar opinion as reported by Yalçın (1970). Whereas, Düzgüneş and Pekel (1966) reported that lamb survival rate decreased with increasing of Merino genotype and Malya sheep breed was created by using combination breeding system. Malya sheep could have been obtained with enthusiasm for obtaining Merino type with a semi-fat-tailed. It has genetically 11/16 Akkaraman, and 5/16 Deutsches Merinofleischschaf (German White-headed Mut-

ton). Unlike Akkaraman with fat tail, Malya breed is semi-fat-tailed and has fine and high quality fleece (Çolakoğlu and Özbeyaz, 1999; Atasever, 2006; Çilek, 2015) because of having Merino genotypes.

Head measures are also part of breed characteristics. Although the head measurements have got economic importance, they are mainly important in terms of understanding the variations observed in different breeds. Çilek and Yıldırım (2014) investigated effects of birth weight, birth type, gender of lamb and maternal age on head measurements of Malya lambs until 1 year of age. There are no studies about head measurements of mature Malya breed ewes and rams so far. This experimental study was done to investigate the effects of age and gender on head measurements of Malya ewes and rams between 1 year old and 5 years and elder animals.

## Material and Methods

This experimental study was done in 2012 after shearing at elite flock of Malya sheep breed reared at Malya state farm that is connected to the General Directorate of Agricultural Enterprises.

Malya state farm is 27 km north-east of the city of Kırşehir, in Middle Anatolia region of Turkey. It has steppe climate and is suitable for sheep breeding. In this study, 55 male and 261 ewes between 1 and 5 years and older were used. Effects of age and gender on head area measurements were investigated. Five age groups were formed beginning from 1 year and ending at 5 years old and older. As sheep older than 5 years were reformed in this state farm, age groups were formed starting with 1 years of age and ending with 5 years. Definitions regarding head measurements are as follows (Bıyıkoglu, 2009, Çilek, 2014, and Çilek and Yıldırım, 2014): head length: distance between *crista occipitalis* and *os incisivum*; Head circumference: circumfer-

ence measurements from the bottom of the ear; head width: the widest part of head measured at a bit upper height from the point between both eyes; distance between ears: distance between both bottoms of the ear; ear length: distance from the bottom of the ear to tip of the ear; ear width: width between two edges measured from where ear is the widest.

General linear model was used in Minitab program to investigate effects of age and gender on these traits (Tekin, 2010). Minitab packet program was used for statistical analysis (Minitab, 1998). The least square means method was used for determination of effective factors on head measurements. Duncan's multiple range tests was used for multiple comparisons in important subgroups (Duncan, 1955; Tekin, 2000).

## Results and Discussion

The least square means of head measurements of 1 year old lambs, sheep and rams are presented in Table 1.

**Table 1**  
Least squares means of measurements of head area for Malya breed ewes and 1 year old yearlings

	n	Head length	Head circumference	Head width	Distance between ears	Ear length	Ear width	
level of importance between female and male in age groups		0.000- 0.010	0.000	0.000-0.026	0.000	0.004-0.781	0.004- 0.589	
1 year old	Female	48	29.48±0.59 b	43.37±0.26 b	12.19±0.12 b	17.09±0.17 b	14.84±0.15 ns	8.25±0.07 b
	Male	22	32.77±0.87 a	48.77±0.38 a	13.23±0.17 a	20.75±0.24 a	15.14±0.23 ns	8.62±0.10 a
2 years old	Female	77	31.14±0.16 b	44.07±0.25 b	11.65±0.09 b	18.26±0.18 b	15.80±0.17 a	8.55± 0.07 ns
	Male	7	32.57±0.52 a	52.57±0.83 a	14.79±0.28 a	22.57±0.60 a	14.29±0.57 b	8.41±0.24 ns
3 years old	Female	41	31.37±0.20 b	45.28±0.38 b	12.01±0.13 b	18.38±0.18 b	15.52±0.20 ns	8.70± 0.08 ns
	Male	8	33.88±0.45 a	58.31±0.85 a	15.56±0.30 a	24.13±0.41 a	15.13±0.44 ns	9.03± 0.19 ns
4 years old	Female	47	31.73±0.16 b	45.25±0.35 b	12.00±0.11 b	18.54±0.19 b	15.35±0.18 ns	8.50± 0.09 ns
	Male	9	34.89±0.38 a	57.44±0.80 a	16.00±0.26 a	24.39±0.44 a	15.22±0.42 ns	8.89± 0.21 ns
5 years old	Female	48	31.82±0.19 b	45.29±0.29 b	11.95±0.12 b	18.52±0.19 b	15.56±0.17 b	8.48± 0.09 ns
	Male	9	35.44±0.44 a	53.17±0.68 a	12.67±0.29 a	23.08±0.44 a	16.83±0.39 a	8.83± 0.20 ns
level of importance between age groups		0.000	0.000	0.000	0.000	0.003	0.003	
1 year old	70	31.06±0.27 c	46.67±0.30 c	12.92±0.12 b	19.10±0.17 b	14.94±0.16 b	8.42±0.07 b	
2 years old	84	32.48±0.28 b	48.39±0.30 b	12.83±0.12 b	20.54±0.17 a	15.68±0.16 a	8.66±0.07 a	
3 years old	49	32.76±0.34 ab	50.33±0.37 a	13.33±0.14 a	20.87±0.21 a	15.47±0.20 a	8.85±0.09 a	
4 years old	56	33.23±0.32 a	50.14±0.35 a	13.39±0.14 a	21.05±0.20 a	15.34±0.19 ab	8.66±0.08 a	
5 years old	57	33.40±0.32 a	49.49±0.34 a	12.82±0.13 b	20.82±0.20 a	15.76±0.19 a	8.63±0.08 a	
level of importance between sex groups		0.000	0.000	0.007	0.000	0.931	0.001	
Female	261	31.12±0.14 b	44.67±0.15 b	11.96±0.06 b	18.17±0.09 b	15.43±0.08 ns	8.50±0.04 b	
Male	55	34.05±0.31 a	53.33±0.33 a	14.16±0.13 a	22.78±0.19 a	15.45±0.18 ns	8.79± 0.08 a	
Means	316	32.59±0.17	49.00±0.18	13.06±0.07	20.48±0.10	15.44±0.10	8.64±0.04	

Data show mean Significant: P<0.05, Non-significant: P>0.05, **a, b, c**: The differences between the means of groups carrying various letters in the same column are significant

The effect of age and gender on head measurements was significant ( $P < 0.01$ ). The differences between females and males in all age groups were significant ( $P < 0.05$ ) for head measurements and males have bigger head measurements than females. Differences between females and males in different age groups for ear length were significant for the animals aged 2 and 5. While males have shorter ear length than females in 2-year-olds group, males have longer ear length than females in 5-year-olds. Females have generally longer ear length than males.

Effects of gender on head measurements are presented on Fig. 1. It could be seen that males have bigger head length, head circumference, head width distance between ears and ear width than females except for ear length.

Effect of age on head measurements is presented on Fig. 2.

It could be seen that head and ear measurements of yearlings were smaller than other ages. This shows head and ear measurements increased until 5 years of age.

Effect of age and gender on all head area measurements were statistically significant ( $P < 0.01$ ) except for effect of gender on ear length. Head measurements in males were greater than females.

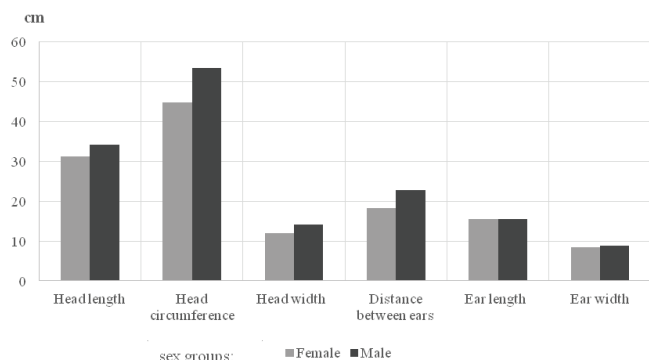


Fig. 1. Effect of sex on head measurements

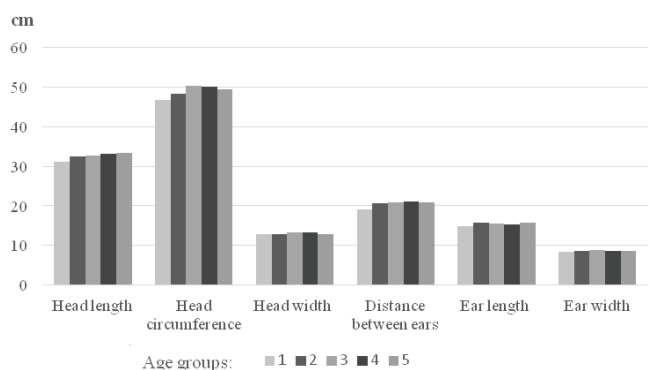


Fig. 2. Effect of age on head measurements

It can be said that head measurements increased with increasing of age and were larger in males than females. The differences between females and males in all age groups were significant ( $P < 0.001$ ;  $P < 0.05$ ) except for ear length and ear width.

Average head length was 31.12 cm for females, and 34.05 cm in males. Head length for ewes is longer with values between 18.10 cm and 24.6 cm for Akkaraman and Merino ewes (Gürcan and Akçapınar, 2006; Yılmaz et al., 2011; Koncagül et al., 2012). Average head width is 11.96 cm for females, 14.16 cm for males. Head width is similar and values are between 11.10 cm and 12 cm for Merino (Gürcan and Akçapınar, 2006), between 10.8 cm and 12.1 cm (Koncagül et al., 2012) and 13.48 cm for Australia Merino (Latorre et al., 2011), between 12.4 and 13.7 cm for Akkaraman rams (Koncagül et al., 2012) and shorter than Balami sheep with 16.7 cm (Yakubu and Ibrahim., 2011). Distance between the ears was  $18.17 \pm 0.09$  in female and  $22.78 \pm 0.19$  male. It can be said that distance between the ears depends on the changes to head circumference and head width and was longer in male than female (Table 1).

Although the differences between males and females for ear length in 2-year and 5-year age groups were statistically significant ( $P < 0.01$  and  $P < 0.05$ ), females have longer ear length than males in some age groups. It can be caused by big variation in ear length in Malya sheep. Although ear length of males in the 2<sup>nd</sup> age group was shorter than the females', ear length of males is longer than the females' in 5<sup>th</sup> age group. This big variation for ear length of Malya sheep may be caused by be a cross-bred of Merino and Akkaraman which have longer ear length. Mean ear length in this study was 15.44 cm and longer than 13.7 cm for Merino sheep (Gürcan and Akçapınar, 2006). However, mean of ear length in this study was shorter than 17.7 cm for Akkaraman sheep (Yılmaz et al., 2011).

## Conclusion

It can be concluded that age and gender affected on all measurements in the head area. Males have bigger head structure than females except for ear length. All measurements in the head area of 1 year olds are increased significantly with increasing age until 5 years of age. As the morphological characteristics for the head structure of Malya sheep were determined for the first time, this study is significant in terms of a reference to future studies, which will be done on the head area at Malya sheep and other sheep breeds.

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