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Authors: Fatma İşbilir, Barış Can Güzel, Ali Gülaydin, Om Prakash Choudhary

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Fatma İşbilir[1], Barış Can Güzel[1], Ali Gülaydin[2], Om Prakash Choudhary[3]

[1]Siirt University, Department of Anatomy, Faculty of Veterinary Medicine, Siirt, Turkey
[2]Siirt University, Department of Surgery, Faculty of Veterinary Medicine, Siirt, Turkey
[3]Department of Veterinary Anatomy and Histology, College of Veterinary Sciences and Animal Husbandry, Central Agricultural University (I), Selesih, Aizawl, Mizoram, India

Address for correspondence: Dr. Om Prakash Choudhary, Department of Veterinary Anatomy and Histology, College of Veterinary Sciences and Animal Husbandry, Central Agricultural University (I), Selesih, Aizawl-796015, Mizoram, India, tel: +92-9928099090, email: dr.om.choudhary@gmail.com

ABSTRACT

Siirt-colored Mohair goat is one of the breeds that contributed significantly to the existence of Mohair goats reared in Turkey. Morphological and morphometric characteristics of the Siirt-colored Mohair goat remained vague owing to a lack of studies. Recent advances in high-tech imaging have replaced conventional two-dimensional anatomical structures with three-dimensional (3D) models. In our study, morphometric features were determined by 3D modeling from computed tomography images obtained from the skull and mandibular bones of Siirt-colored Mohair goats. For this purpose, the skulls and mandibular bones of 20 Siirt-colored Mohair goats (10 females and 10 males) were used. The images were reconstructed with the help of a particular software program. The craniometric data were analyzed in terms of sexual dimorphism, and statistically significant difference was found in the A5, A18, and A31 measurement parameters ($P<0.05$) and Skull index ($P<0.01$) parameters. In the mandible measurements, there was a statistically significant difference between the sexes in C5, C10 measurement points ($P<0.05$), C2, C8, C12, C18, C21 measurement points ($P<0.001$) and surface area parameter ($P<0.01$). The morphometric data obtained

is a resource in the fields of zoo archaeology, anatomy, forensics, anesthesia, surgery, and treatment.

Keywords: colored Mohair goat, three-dimensional, modeling, skull, mandible, topographic, craniometry

INTRODUCTION

In Turkey, the amount of Mohair goats breeding in the Eastern and Southeastern Anatolia regions makes a great contribution to the existence of goats [60]. It has been reported that the colored Mohair goat is mainly raised in the provinces of Siirt, Batman, and Şırnak [22, 25, 30]. Mohair, which is the raw material of Siirt blanket, is a handicraft product woven on looms in the Siirt region, obtained by shearing goats. It is also used for weaving bags, vests, gloves, berets, socks, and various ornaments offered for touristic purposes [60].

There are morphological differences in the horn and ear structures of the Siirt-colored Mohair goat. Male goats have longer horns and more drooping ears than female goats. They usually have black, white, brown, yellow, and red feathers [60].

Foramina located in the skull are the exit sites of the nerves. It is important to identify the precise location of these foramina for a local anesthetic block of their branches. In addition to these palpable foramina in ruminants, foramina such as infraorbital foramen, mental foramen, supraorbital foramen, mandibular foramen, oval foramen and maxillary foramen are clinically important foramina [1, 24].

The phenotypic characteristics of animals may vary according to geography, race, and nutritional status. These changes occur separately in the skull as well as in the skeletal system [26].

The skull bones are divided into two parts, the cranium and the facies. The skull contains centers related to the brain, vision, hearing, and balance. It is also very important in that it includes the initial parts of the digestive and respiratory systems [13, 39]. The formations on the skull and mandible are the distinctive features of each animal and provide differentiation not only in races and species but also in the sexes [38]. These distinctive features make it the most commonly used structure in taxonomy [29].

It has been reported that craniometric studies have made an outstanding contribution to comparative anatomy, clinical applications, and taxonomy [36, 41, 47]. It is imperative to note that detailed biometry of the skull is requisite in clinical and biomechanical analyses [48, 57, 61].

Recent advances in high-tech imaging have replaced conventional two-dimensional anatomical structures with three-dimensional (3D) models [33, 55]. Bio-models are developed through cross-sectional imaging methods. Detailed examination of the 3D modeling structure helps in the treatment and prognosis of diseases [21, 42, 49, 53]. Craniometric studies were performed on sheep breeds to draw attention to breed and sex differences [19, 34, 62]. However, 3D craniometric studies on goats are limited and mostly studied on the mandible. Modeling studies were carried out to contribute to the field of osteogenesis [3, 40] and oral health [44] because of its impact on systemic health [52]. Sound topographical and anatomical knowledge of the area to be treated is required to avoid any adverse intervention during treatment [2, 43, 44]. In dentistry, 3D modeling studies of the goat mandible are leading for screw applications [35].

Although various selection studies have been carried out on Ankara Mohair goats depending on the importance of mohair, no conscious selection and breeding studies have been carried out on colored Mohair goats [32, 60].

Morphological and morphometric characteristics of Siirt-colored Mohair goats, one of the breeds bred in Turkey, remain uncertain due to the lack of studies.
In this study, we aimed to investigate and record the morphological, morphometric, and topographic features of the skull and mandible bones of the Siirt-colored Mohair goat with a 3D modeling method. In addition, it is among the objectives to contribute anatomically and topographically to the use of clinical and anesthetic techniques.

MATERIALS AND METHODS

The skull and mandible samples used in our study were collected from a slaughterhouse in Siirt, Turkey. Morphometric analyses were performed on the skull and mandible of 20 (10 female and 10 male) adult (1-3 years) Siirt-colored Mohair goats in total. No clinical findings were found on the skull and mandible bones. Skull and mandibles of Siirt-colored Mohair goats were scanned at 80 kV, 200 MA, 639 mGY, and 0.625 mm thickness using 64 detector MDCT (General Electric Revolution). [54], was taken as a reference in the screening dose and protocol. The resulting images were saved in DICOM format. Sections were taken with the CT device at Siirt University Medical Faculty Hospital. Reconstructions were made with the help of 3D Slicer (5.0.2) software (Figure 1). Taking sources [29] and [58] as references, measurement parameters were determined and morphometric measurements were performed. The definitions and abbreviations of the measured osteometric parameters are given in Table 1 and Table 2. Figures 1, 2, 3, and 4 present measurement points on the skull and mandible. From the obtained CT images, 35 measurement parameters and 4 index calculations were performed on the skull. Cranial and facial index formulas are presented in Table 3. 27 osteometric measurements of the mandible were taken. After the morphometric measurements were completed, the surface area and volume values of the mandible were calculated. The SPSS22.0 program was used for statistical analyses. Mean± standard error (SD) values were calculated and an Independent t-test determined the difference between male and female goats. The procedures applied in the present study were approved by the Siirt University Experimental Animals Application and Research Centre with the ethics committee report numbered 03/2023.

RESULTS

In our study, a total of 35 osteometric and topographic measurements were made on the skull of Siirt-colored Mohair goats (Figures 1 and 2). Table 4 and Table 6 show the mean values and standard errors of the measurements. Skull indexes are shown in Table 5. When the craniometric data were analyzed in terms of sexual dimorphism, a statistically significant difference was determined in the parameters of A5, A18, and A31 measurement parameters ($P<0.05$) and Skull index ($P<0.01$). No statistically significant difference was observed between the genders in terms of other parameters ($P>0.05$).

In the study, 25 osteometric and topographic measurement parameters of the mandible were determined. Measurements are shown in Table 7. The measurement points of the mandible were presented in Figures 3 and 4. The surface area and volumes of the mandible of the Siirt-colored Mohair goat were calculated. As a result of the statistical evaluation, it was determined that the C5 and C10 measurement points showed a significant difference ($P<0.05$). When C2, C8, C12, C18, and C21 measurement parameters were examined statistically, a significant difference was observed (P<0.001). The surface area values of the mandible (C24) were found to be statistically significant (P<0.01).

DISCUSSION

Although various selection studies have been carried out on Mohair goats depending on the importance of mohair, no conscious selection and breeding studies have been carried out on colored Mohair goats [60]. Our study is the first research to determine the morphometric features of the skull and mandibular bones of Siirt-colored Mohair goats.

The median frontal bone length parameter (A5), while this value was reported as 8.85±0.53 cm in females and 8.92±0.61 cm in males in the Sharri sheep breed, no statistically significant difference was observed [34]. The same value was determined to be 8.49±0.68 cm in the male Hemshin sheep [15]. In this study, the results of the A5 parameter were close to the data presented in the study on the Bardhoka sheep breed [29]. In addition, a statistical difference was determined similar to the same study. The frontal sinus has been reported to be limited to the frontal bone in small ruminants. Measurement parameters such as the cranium length, the distance from the parietal-frontal suture to the nuchal line, and the median of the frontal bone length have an important place in frontal sinus trephination [10]. In blackbuck, the frontal bone makes a big contribution to the formation of the orbit is orbital margin has an almost circular shape. The mean maximum height, length, and depth of the orbit were 3.83±0.02 cm, 4.13±0.02 cm, and 4.61±0.008 cm, respectively [11]. In our study, the orbit was an oval appearance, flattened from the sides.

The dental length value (A18) was analyzed as 12.66±0.66 cm in Bardhoka sheep breeds females and 12.94±0.97 cm in males [29]. Also, in Sharri sheep, dental length was reported as 13.85±0.57 cm in females and 13.32±1.52 cm in males [34]. In our study, this parameter was determined as 14.28±0.13 cm in male goats and 12.73±0.067 cm in female goats. Contrary to the Bardhoka race, statistically significant differences were found between the sexes (P<0.05).

The height and width of the foramen magnum in Georgian goats were reported as 2.23±0.24 cm and 1.98±0.18 cm in females and 2.12±0.23 cm and 2.14±0.34 cm in males, respectively [16]. These parameters were determined as 1.81±0.02 cm and 1.71±0.01 cm in females, and 5.73±0.01 cm and 2.43±0.06 cm in males in Mizoram goats [7]. In our study, foramen magnum height and width parameters had smaller values compared to Kagani goats [56]. In addition, foramen magnum height had a smaller value compared to the data reported in Beetal goats, while foramen magnum width value was found to be approximately the same as Beetal goats [23].

The skull index value was analyzed by [56] as an average of 4.19 cm in Kagani goats, 4.92±0.34 cm in males, and 4.83±0.48 cm in females in Gurcu goats [16]. This index was reported as 5.21±0.21 cm in Saanen goats [59], 4.77±0.19 cm in Markhoz goats [28], and 4.78±0.005 cm in Mizoram goats [7]. In addition, the skull index of Beetal goats was 5.73±0.01 cm in females and 5.77±0.01 cm in males [23], and the Abaza goats have been reported as 5.1±0.18 cm [17]. The skull index values determined in our study were lower than the reported goat breeds.

The distance from the infraorbital foramen to the facial tuberosity (A20) parameter is important for following the infraorbital nerve and for anesthetic applications in the clinic. The infraorbital nerve should be anesthetized at the level of the infraorbital foramen during manipulations of the upper lip, nostril, and facial skin. Analgesia of the incisor, canine, and first two premolar teeth is provided by injection of an anaesthetic drug from the infraorbital foramen into the infraorbital canal [4, 5, 6, 8]. A20 parameter was reported as 2.37±0.009 cm in blackbuck [11], 2.25±0.03 cm in Mizoram goats [7], 2.59±0.17 cm in females, and 2.58±0.3 cm in males [29] in Bardhoka sheep. In our study, the A20 parameter was found to be higher in Siirt-colored Mohair goats than in West African Dwarf (WAD) goats [45] and Mizoram goats [7] and lower than Bardhoka sheep [29].

The A21 morphometric measurement parameter is very important in infraorbital nerve anesthesia. In Siirt-colored Mohair goats, infraorbital nerve block can be achieved by injecting the anesthetic drug approximately 2 cm above the root of the upper first premolar tooth in males and approximately 1.5 cm in females. This value was reported as 1.3 cm-1.6 cm in WAD goats [45], 1 cm in barking deer, and 1.8 cm in sambar deer [7].

Although the diastema region seems to be a suitable region for research experimental distraction osteogenesis, bone defect, plate, screw type, etc., the presence of the mandibular canal in sheep and goats should be taken into consideration by the investigators [27]. The presence of a mandibular canal necessitates a good knowledge of the diastema length. Also, diastema has an important place in mandibular fracture surgery [46]. In our study, C10 parameter data were found to be smaller than the data reported in the study [27] conducted in sheep and goats. In male goats, the C10 value was smaller than that of males of the Hashmer sheep breed [51], whereas, in female goats, this value was close to that of females of the Hasmer sheep breed [51]. The same parameter was larger in male goats than in Awassi breed males [62] and smaller in female goats than in Awassi breed females [61].

The value of the length between GOC and the oral alveolar edge of P2 (C5) had larger values compared to the Norduz sheep breed [18]. However, the C5 value was very close to the values reported in the Hamdani sheep breed [31].

In a 2014 study, the length between ID and the aboral edge of the condylar process parameter (C2) was reported as 15.55±0.52 cm in Tuj sheep and 16.04±0.72 cm in Morkaraman sheep [20]. In our study, the same parameter was determined to be larger than the Romanov sheep breed.

The length of the molar row is shorter in goats than in sheep. Approximately 49% of the length of the mandible in sheep and 42% in goats is the length of the molar tooth row [27]. Molar tooth row length (C8) value was determined as 2.66±0.19 cm in the right half and 2.57±0.31 cm in the left half in Norduz sheep breed rams [18]. The same value was reported as 5.72±0.38 cm in Hemsin sheep [14], 3.86±0.99 cm in Awassi rams, and 4.38±0.62 cm in ewes [62]. In contrast to the study on sheep and goats [27], Siirt-colored Mohair goats were found to have higher values of C8 parameter than sheep breeds. In addition, the mean value of the length between the GOV and the deepest point of the incisura mandibula (C12) parameter was smaller than the values determined in Hasmer sheep breed [38] and larger than the values determined in Abaza goats [17].

The length between the coronion and the highest point of the condylar process (C18) was determined as 2.57± 0.05 cm in Hamdani rams and 2.5± 0.06 cm in sheep [31]. At the same time, the Awassi sheep breed was determined as 2.25±0.3 cm in rams and 2.69±0.31 cm in sheep [62]. The C18 parameter values obtained in our study were higher than those of the Awassi and Hamdani sheep breeds. In addition, the width of the mandibular space at the coronoid process level (C21) parameter was smaller in female goats than in Awassi breed sheep [50], while it was higher in male goats. The same parameter in both sexes had higher data than the values reported in the Hamdani sheep breed [31].

The distance between the lateral incisor tooth and the mental foramen (C26) parameter is important data to determine the location of the mental foramen in regional nerve anesthesia applications. Anaesthesia through the mental foramen results in sensory loss of the lower incisors, premolars, and lower lip [5, 8, 12]. This distance was reported as 2.45±0.02 cm in blackbuck [9], 2.84±0.01 cm, 2.78±0.01 cm and 3.04±0.02 cm, 2.96±0.01 cm in Barking deer and Sambar deer males and females, respectively [37]. According to the study results, a mental nerve block can be achieved extraorally in Siirt-colored Mohair goats by injecting the anesthetic drug approximately 2 cm caudal to the fourth lower incisor, lateral to the margo interalveolaris.

The proportional difference between average values is indicated by the difference between ratios or indexes. This difference creates a difference in surface area. This suggests that the statistically significant difference between males and females occurs in ratios and indexes that are not recognized in linear measurements and may be related to the surface area [50]. A study on the mandibles of gazelles reported that the surface area (C24) was 2.51±0.33 cm^2 in males and 2.12±0.26 cm^2 in females [63]. While the mandibular surface area of Hamdani sheep was determined as 2.43±0.22 cm^2 in males and 2.78±0.32 cm^2 in females [31], a statistically significant difference was found between male and female animals, similar to our study ($P<0.01$).

CONCLUSIONS

Our finding is the first reconstructive and morphometric study on the skull and mandible in a Siirt-colored Mohair goat. Considering the data obtained, it was concluded that the morphometric values of the skull and mandible showed similarities and differences with the goat breeds bred in Turkey. The data included key anatomical results that will benefit anatomical, surgical, zoo-archaeological, and taxonomic research. In addition, topographic examinations will help in blocking the terminal branches of the cranial nerves.

Conflict of interest: None declared

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Figure 1. Osteometric measurement points (dorsal and lateral) of the skull of the Siirt colored mohair goat; **A.** Dorsal; **B.** Lateral.

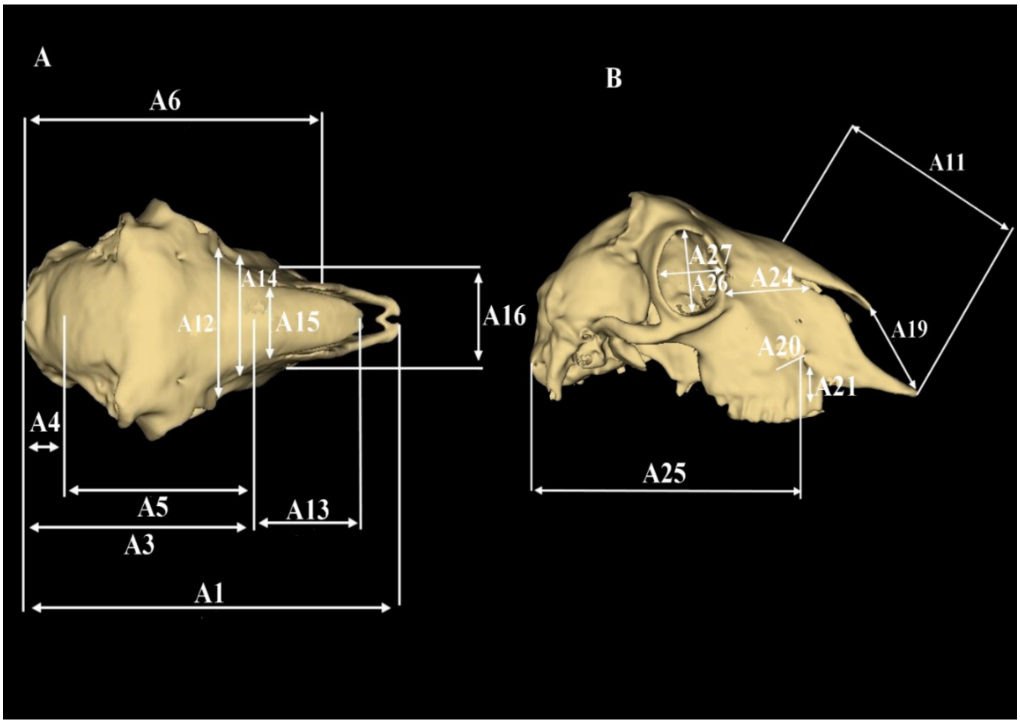

Figure 2. Osteometric measurement points (Ventral and Caudal) of the skull of the Siirt colored mohair goat; **C.** Ventral; **D.** Caudal.

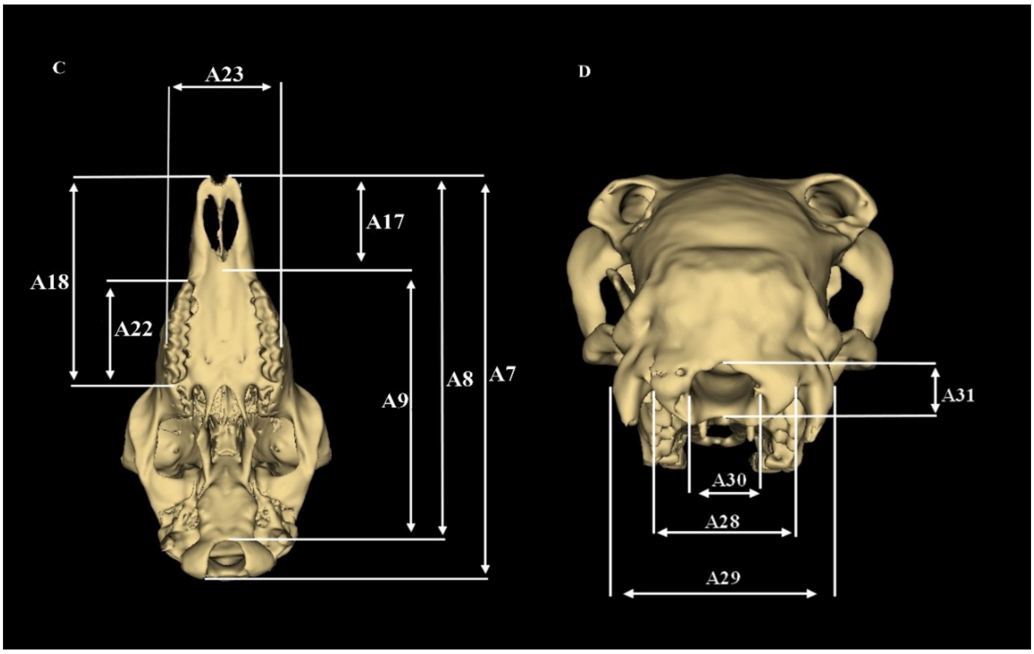

Figure 3. Osteometric measurement points of the mandible of Siirt colored mohair goat

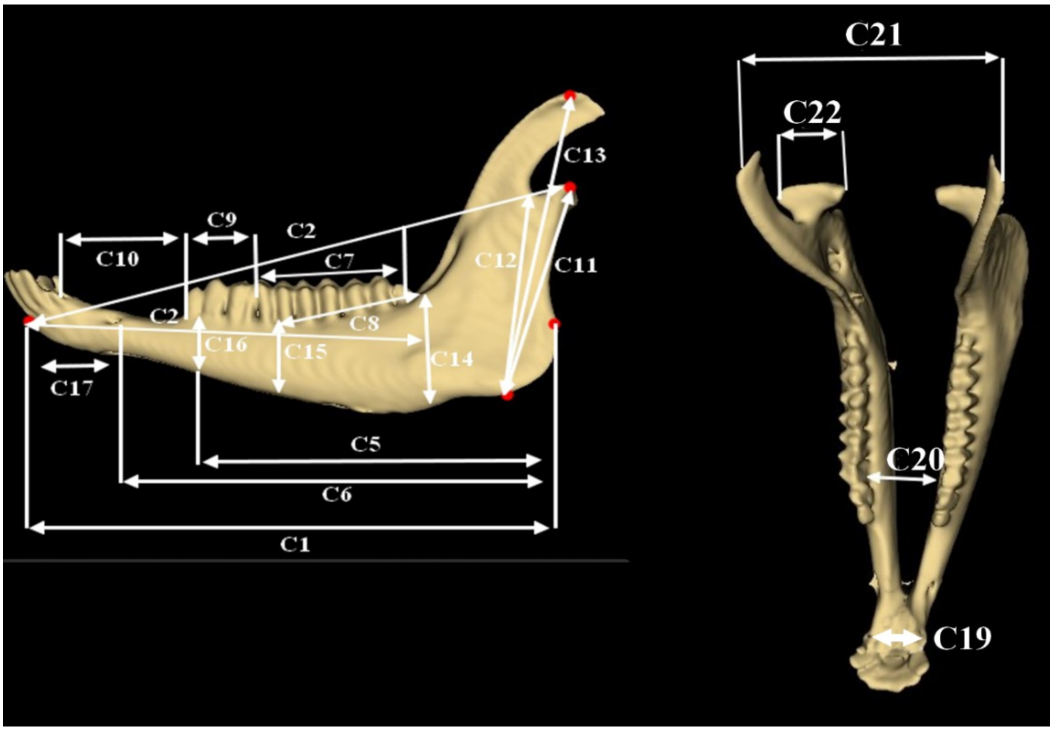

Figure 4. Topographic measurement points of the mandible of the Siirt colored mohair goat.

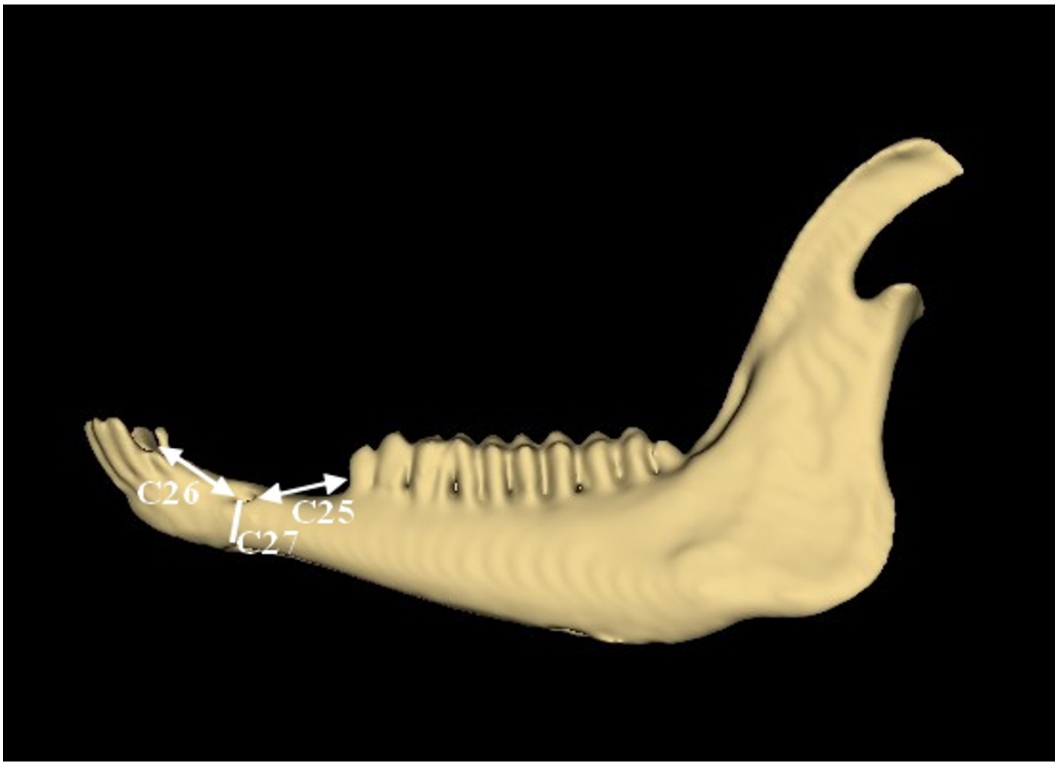

Table 1. Osteometric and topographic measurement points of the cranium of the Siirt-colored Mohair goat

A1	The total skull length
A2	The skull width (the distance between two zygomatic arches)
A3	The cranium length (distance from nuchal line to the junction of the left and right nasofrontal sutures on the median plane)
A4	The distance from parieto-frontal suture to nuchal line
A5	The median of the frontal bone length
A6	The distance from left infraorbital foramen to nuchal line
A7	The condylobasal length—from incisive bone to the occipital condyles
A8	The basal length—distance from incisive bone to the intercondylar incisura
A9	The short skull length—distance from premolar the 2nd (PM2) to the intercondylar incisura
A10	The greatest cranium width
A11	The facial length
A12	The distance between caudal border (margin) of the orbits
A13	The greatest length of nasal bone
A14	The least width between the cranial border (margin) of the orbits
A15	The greatest width between the nasal bones
A16	The facial width (between two facials tuberosity)
A17	The distance from incisive bone to premolar the 2nd (PM2)
A18	The distance from tip of incisive bone to caudal border of the last molar (dental length)
A19	The distance from incisive bone to septal process of nasal bone
A20	The distance from infraorbital foramen to facial tuberosity
A21	The distance from facial tuberosity to alveolar process of maxilla
A22	The molar row length (premolars and molars)
A23	The greatest palatal width (across the outer border of the molars)
A24	The greatest length of the lacrimal bone
A25	The distance from the caudal border of the left occipital condyle to the infraorbital foramen of the same side
A26	The length diameter of the orbit
A27	The width diameter of the orbit
A28	The greatest width of the occipital condyles
A29	The greatest width of the bases of the pre-condylar processes
A30	The greatest width of the foramen magnum
A31	The height of the foramen magnum
A32	The distance between two foramina infraorbital
A33	The distance between foramen infraorbitale and tuber faciale
A34	Distance between foramen infraorbital and premolar tooth
A35	The distance between foramen infraorbitale and orbita

Table 2. Osteometric and topographic measurement points of the mandible of the Siirt-colored Mohair goat

C1	Length between gonion caudale (GOC) and infradentale (ID)
C2	Length between ID and the aboral edge of the condylar process
C3	Length between GOC and aboral alveolar edge of Molar 3 (M3)
C4	Length between ID and the alveolar edge of the M3
C5	Length between GOC and the oral alveolar edge of Premolar 2 (P2)
C6	Length between GOC and aboral end of mental foramen
C7	The total length of cheek tooth row (Premolar 1- Molar 3)
C8	Molar tooth row length
C9	Premolar tooth row length
C10	Diastema length
C11	Length between Gonion ventrale (GOV) and the highest point of condylar process

C12	Length between GOV and the deepest point of the incisura mandible
C13	Length between GOC and coronion
C14	Height of mandibula in the plane of posterior alveolar edge of M3
C15	Height of mandible in plane of anterior alveolar edge of Molar 1
C16	Height of the mandible in the plane of the anterior alveolar edge of P2
C17	Length between ID and oral tip of the mental foramen
C18	Length between the coronion and the highest point of condylar process
C19	Width of mandible at last incisive tooth level
C20	Width of the mandible at the level of the first molar tooth
C21	Width of the mandibular space at the level of the coronoid process
C22	Condylar process width
C23	Mandible volume
C24	Mandible surface area
C25	Distance between first premolar tooth and mental foramen
C26	Distance between lateral incisor tooth and mental foramen
C27	Distance between the base of the mandible and mental foramen

Table 3. Cranial and facial index formulas of Siirt-colored Mohair goat

Skull index	The skull width (the distance between two zygomatic arches) × 100/total skull length
Cranium index	The greatest cranium width × 100/the cranium length (Distance from nuchal line to the junction of the left and right nasofrontal sutures on the median plane)
Foramen magnum index	The height of the foramen magnum × 100/the width of the foramen magnum
Facial index	The facial width × 100/facial length

Table 4. Osteometric measurements of the cranium of the Siirt-colored Mohair goat (cm)

	Group	**N**	**Mean**	**Std. Error Mean**	**P**
A1	Male	10	26.25	0.201	0.054
	Female	10	24.71	0.113	
A2	Male	10	11.10	0.092	0.002
	Female	10	10.62	0.040	
A3	Male	10	14.12	0.054	0.908
	Female	10	13.07	0.059	
A4	Male	10	5.6	0.030	0.517
	Female	10	4.74	0.038	
A5	Male	10	9.78	0.060	0.025
	Female	10	8.82	0.032	
A6	Male	10	18.96	0.058	0.903
	Female	10	17.69	0.062	
A7	Male	10	27.04	0.180	0.640
	Female	10	25.01	0.122	
A8	Male	10	24.3	0.115	0.127
	Female	10	22.74	0.081	
A9	Male	10	18.33	0.049	0.524
	Female	10	17.38	0.072	

A10	Male Female	10 10	6.38 6.18	0.298 0.042	0.075
A11	Male Female	10 10	14.99 14.22	0.131 0.093	0.447
A12	Male Female	10 10	13.03 11.53	0.070 0.051	0.343
A13	Male Female	10 10	9.69 8.61	0.051 0.037	0.229
A14	Male Female	10 10	9.74 7.97	0.073 0.112	0.472
A15	Male Female	10 10	4.52 3.67	0.077 0.100	0.242
A16	Male Female	10 10	4.43 3.65	0.084 0.065	0.686
A17	Male Female	10 10	5.44 4.74	0.041 0.052	0.307
A18	Male Female	10 10	14.28 12.73	0.138 0.067	0.026
A19	Male Female	10 10	5.63 6.51	0.040 0.070	0.011
A20	Male Female	10 10	2.67 2.27	0.062 0.050	0.791
A21	Male Female	10 10	1.83 1.47	0.021 0.023	0.823
A22	Male Female	10 10	6.84 6.33	0.033 0.037	0.777
A23	Male Female	10 10	7.05 6.36	0.063 0.050	0.253
A24	Male Female	10 10	4.53 4.06	0.051 0.034	0.239
A25	Male Female	10 10	16.21 15.59	0.046 0.048	0.766
A26	Male Female	10 10	4.34 3.91	0.055 0.050	0.725
A27	Male Female	10 10	4.11 3.62	0.023 0.042	0.095
A28	Male Female	10 10	6.21 4.94	0.031 0.027	0.753
A29	Male Female	10 10	7.55 6.52	0.053 0.070	0.510
A30	Male Female	10 10	2.25 1.8	0.034 0.027	0.722
A31	Male Female	10 10	2.17 1.88	0.009 0.023	0.034

Table 5. Cranial and facial index of Siirt-colored Mohair goat

	Group	N	Mean	Std. Error Mean	P
Skull İndex	Male Female	10 10	4.23 4.29	0.049 0.015	0.001
Cranium index	Male Female	10 10	4.73 4.72	0.043 0.049	0.696
Foramen magnum index	Male Female	10 10	8.81 10.47	0.876 0.250	0.216
Facial index	Male Female	10 10	3.05 2.56	0.125 0.054	0.164

Table 6. Topographic measurement points of the cranium of the Siirt-colored Mohair goat

	Group	N	Mean	Std. Error Mean	P
A32	Male Female	10 10	4.57 4.26	0.038 0.030	0.771
A33	Male Female	10 10	2.68 2.31	0.038 0.032	0.556
A34	Male Female	10 10	2.43 1.81	0.042 0.024	0.205
A35	Male Female	10 10	5.72 5.31	0.030 0.053	0.222

Table 7. Osteometric and topographic measurement points of the mandible in Siirt-colored Mohair goat

	Group	N	Mean	Std. Error Mean	P
C1	Male Female	10 10	17.13 16.73	0.148 0.120	0.496
C2	Male Female	10 10	18.86 18.56	0.113 0.185	0.09
C3	Male Female	10 10	5.74 5.12	0.175 0.353	0.348
C4	Male Female	10 10	12.43 12.04	0.143 0.213	0.090
C5	Male Female	10 10	12.01 10.55	0.020 0.12	0.038
C6	Male Female	10 10	14.16 13.61	0.103 0.156	0.325
C7	Male Female	10 10	6.91 6.41	0.126 0.102	0.871
C8	Male Female	10 10	6.74 6.03	0.103 0.186	0.002
C9	Male Female	10 10	2.08 1.94	0.183 0.214	0.522
C10	Male Female	10 10	5.14 4.33	0.326 0.136	0.038
C11	Male	10	7.16	0.176	0.424

	Female	10	6.83	0.187	
C12	Male Female	10 10	6.73 6.40	0.255 0.164	0.007
C13	Male Female	10 10	9.65 9.31	0.102 0.115	0.654
C14	Male Female	10 10	4.12 3.86	0.185 0.180	0.975
C15	Male Female	10 10	2.42 2.30	0.190 0.219	0.502
C16	Male Female	10 10	2.07 1.17	0.193 0.296	0.314
C17	Male Female	10 10	3.92 3.67	0.174 0.207	0.121
C18	Male Female	10 10	3.10 3.08	0.157 0.245	0.003
C19	Male Female	10 10	2.96 2.70	0.182 0.192	0.410
C20	Male Female	10 10	3.19 2.98	0.136 0.180	0.105
C21	Male Female	10 10	7.24 6.56	0.164 0.053	0.001
C22	Male Female	10 10	2.32 2.11	0.115 0.128	0.612
C23	Male Female	10 10	5.09 4.88	0.179 0.172	0.841
C24	Male Female	10 10	678.23 267.53	363.52 795.62	0.001
C25	Male Female	10 10	1.66 1.55	0.035 0.034	0.784
C26	Male Female	10 10	2.28 2.06	0.031 0.029	0.975
C27	Male Female	10 10	0.78 0.67	0.010 0.034	0.081