



Some Phenotypical Characteristics of Camels Raised in Provinces of Balıkesir and Çanakkale of Turkey

Orhan Yılmaz^{1*} Yakup Erdal Ertürk² Mehmet Ertugrul³

¹ÇOMU, Faculty of Agriculture, Department of Animal Science, Çanakkale, Turkey.

²İğdir University, Faculty of Agriculture, Department of Agricultural Economics, İğdir, Turkey.

³Ankara University, Faculty of Agriculture, Department of Animal Science, Ankara Turkey.

*Corresponding author: zileliorhan@gmail.com

Abstract

This study was conducted first time in Turkey regarding the phenotypic traits of Turkish camels. The aim of this study was to determine the morphological characteristics of Turkish camels raised in Balıkesir and Çanakkale provinces of Turkey. In this study, a total of 81 male camels were used in Burhaniye County of Balıkesir province during a camel wrestling competition. Descriptive statistics of morphological traits for withers height were 161.7±1.42 cm, body length 146.1±1.36 cm, limb length 81.9±0.84 cm, and cannon circumference 16.3±0.24 cm. The results of this study showed that the Turkish camels were smaller than the camels from Sudan and Pakistan. Owners of Turkish camels should be supported by the Turkish government so that they could be survived them as a genetic resource of Turkey for future generations.

Key Words: *Camelus bactrianus*, Even-toed ungulate, Morphologic trait, Genetic resource, Native breed.

Özet

Türkiye'nin Çanakkale ve Balıkesir Bölgelerinde Yetiştirilen Develerin Bazı Morfolojik Özellikleri

Bu çalışma, develerin fenotipik özellikleri üzerine Türkiye'de gerçekleştirilen ilk çalışmadır. Çalışmanın amacı, Balıkesir ve Çanakkale Bölgelerinde yetiştirilen develerin morfolojik özelliklerini tespit etmektir. Çalışmada, Çanakkale İli Burhaniye İlçesi'nde deve güreşleri için bulunan 81 adet erkek deve kullanılmıştır. Morfolojik özelliklere ait tanımlayıcı istatistik değerler cidago yüksekliği 161,7±1,42, vücut uzunluğu 146,1±1,36, bacak uzunluğu 81,9±0,84 ve ön incik çevresi 16,3±0,24 cm olarak bulunmuştur. Çalışmanın sonuçlarına göre; Türkiye'deki develerin Sudan ve Pakistan'da yetiştirilen develere nazaran daha küçük yapıları oldukları görülmüştür. Deve yetiştiricilerinin devlet tarafından desteklenmelerinin ve bu develerin Türkiye'nin bir evcil hayvan genetik kaynağı olarak korunmalarının sağlanması gerektiği düşünülmektedir.

Anahtar Kelimeler: *Camelus bactrianus*, Tek toynaklı, Morfolojik özellik, Genetik kaynak, Yerli ırk.

Introduction

The domestic camel was a solely transport tool on Middle Asian and Middle East trade routs. Camels had a significant role on the Silk or Spice Road as a load and ride animal. Caravan trades were consisted of only camels (Balaban, 2006). Camel provides an easy transport in area in where grass and water are in scarcity (Lattimore, 1967). Camel is a highly resistible animal against hunger and thirst. Camel is also the animal which can carry the heaviest loads. Since Hun Turks period Turks breed camels (Balaban, 2006). Camel was an also war tool by carrying heavy supplies and ammunition transport. Apart from transport tool, camel was effectively used as heavy cavalry weapon of attack with heavy body (Öksüz, 2004). Camel was also used for food and clothing purposes by eating its meat, drinking its milk, and wearing its dry skins (Balaban, 2006). Camel is still being used as a significant livestock animal by the people of rural areas in some countries of Middle Asia and Middle East. It is also called the Ship of Desert in these countries.

Turkey is on the way of important transport passage between Europe and Asia. Since 1950s, the road network of Turkey has been increased while the role of camel in transportation has been decreased (Türkdoğan, 2006). After the improvement in road network, the role of camel is sharply decreased in rural areas. On the other hand, camel meat and milk were not palatable for new generations (Karakaş, 2010; Şeker et al., 2011). Cattle has been replaced the camel in terms of food by providing meat and milk. Cotton textile products have also been replaced camel wool as clothing material (Anonymous, 2001). Consequently, the number of camels has decreased from 118.000 to 1.290 between the period of 1935 to 2011 (Anonymous, 2011, Anonymous, 2012a). In the present era, camels are only used for a short ride in tourism sector as well as for camel wrestling and races. (Çivi, 1995; Enderoğlu, 2005).



Camels are even-toed ungulate ruminant which have soft padded feet (Wilson, 1998). The camels which have a special digestive system unlike other ruminants (Erden et al., 1998) can resist against hunger and thirst for a long period of time as compare to other domestic animals (Aydin, 2003), and can also tolerate a high degree of heat and dehydration (Pradeep and Tiwari, 2005). The Dromedary (*Camelus dromedarius*) has a single hump (shaped like a D) but in case of Bactrian (*C bactrianus*) has two humps (shaped like a B) (Aypak, 2007; Emery, 2010; Azrug, 2011).

Although camels seem as vermin or a public menace and are decided to be shot in Australia (Emery, 2010), in some undeveloped or developing countries camels are widely raised as ride, pack, or transport animals such as in Somalia, Sudan, Ethiopia, Niger, Pakistan and India (Bhakat et al., 2002; Bhakat et al., 2003; Khan et al., 2003; Raza et al., 2004; Faye et al., 2011). The average traction capabilities with relation to the weight of the draught animals are 24% of body weight of donkey, 18% of body weight of camel, 12% of body weight of bullock and water buffalo (Tiwari et al., 2004). Apart from domestic camels about 450 wild Bactrian camels live in Mongolia and fewer than 600 in China (Emery, 2010).

In Turkey, camels have been known for last 2.600 years. Camels used to play a vital role in Turkish history for centuries and were not used only as pack animals but also used as battle and/or war field animals (Albayrak, 2007; Yilmaz et al., 2011). During Ottoman Empire, near about 50.000–60.000 camels were raised by Ottoman army but nowadays only a few thousands of camels are being raised in Turkey (Yarkin, 1965; TurkStat, 2010; FAO, 2011) (Table 1.). Camels are raised for camel wrestling and races (Kocan, 2007, Anonymous, 2012b) (Figure 1., Figure 2., and Figure 3.), slaughtering as a religious sacrificial animal and consumed as food (Cetin et al., 2011) (Figure 4.), as transportation tools from traditional Yoruk Turks who migrates twice a year between plain and highlands (Yarkin, 1965) (Figure 5. and Figure 6.), and for being taken photograph by tourist in some touristic places (Azrug, 2011).

Table 1. Camel numbers and camel meat production in Turkey 1999–2009

Year	Number (Head)	Slaughtered animals (Head)	Meat (Tonnes)
1928	74.437	-	-
1935	118.647	-	-
1937	118.211	-	158
1940	-	-	232
1950	110.305	-	160
1955	72.034	-	342
1960	65.390	1.600	208
1970	39.000	3.140	531
1980	12.000	400	60
1990	2.000	320	75
2000	1.350	29	8
2005	811	49	18
2006	1.004	55	19
2007	1.057	33	11
2008	970	47	14
2009	1.041	55	18
2010	1.254	-	-
2 011	1 290	-	-
Change 1960–2009 (%)	-98,5	-96,5	-91,3

(Yarkin, 1965; TurkStat, 2010; FAO, 2011).



Figure 1. Camel wrestling in Burhaniye city of Balıkesir province of Turkey.



Figure 2. Camel wrestling in Can city of Canakkale province of Turkey.



Figure 3. One of the most famous wrestler camels called as Cesur Yurek (Brave Heart) from village of Karacaoren of Canakkale.



Figure 4. Turkish spicy sausages called in Turkish as 'sucuk' made from camel meat.



Figure 5. Traditional Yoruk Turks migrating from plain to highland.



Figure 6. Yoruk toddler on a camel while migrating from plain to highland

In Turkish culture, camel also has an important figure. In Kazak Turks, there are about 500 proverbs related with camel (Turangil, 2007). In Turkmen Turks sons are called as “my iner” (inerim) and “my kosek” (koseğim). The words of “iner” and “kosek” mean baby camel which is younger than



1 year old (Kara, 2008). A study was carried out to determine place names of Beyşehir county belonged to province of Konya in Turkey. There are about 10 of 2769 place names related with camel, even though there is not camel husbandry at the present time (Arslan, 2011). One of the colours is “devetuyu” which means “camel hair” in Turkish (Celik, 2004). The main character of a novel written in 16th century was a camel which name was “Father Suttur” (Baba Suttur) (Demirel, 2005). Camels also seem as a quite holy animal in Islamic nations including in Muslim Turks. The Prophet of Muhammed used a camel as a ride and also after his death one of his wives whose name was Ayşe ruled a war which name was “Camel War” (Aksu, 2004, İla, 2007).

In literature, there is a few studies on phenotypical characteristics of camels. Wilson (1998) reported that withers height were 193–213 and 182–196 cm for lowland and mountain type camels respectively. Khan et al. (2003) reported that withers height was 220 cm for dromedary camels of Pakistan. Raziq et al. (2011) measured Raigi camels and body sizes were 164 cm for withers height, 139 cm for rump length, 90 cm sternal pad distance from the ground (limb length), 20 cm for cannon circumferences, 43 cm for chest width, and 374 kg for live weight. Ishaq (2011) reported that body sizes were 188 cm for withers height, 199 cm for heart girth circumferences, 244 cm for barrel girth circumferences, and 451 kg for live weight.

The aim of this study is to define some phenotypical traits of camels raised in western part of Turkey by comparing with camels from various countries of the world.

Materials and Methods

Experimental animals

In this study a total of 81 male camels which were raised in provinces of Balıkesir (39° 30'N; 26° 58'E) and Çanakkale (40° 09'N; 26° 24'E) was analysed by during camel wrestling organized in Burhaniye county of Balıkesir province in January 2012 (Anonymous, 2012c). Withers height (WH), body length (BL), limb length (LL) and cannon circumference (CC) were measured using the method of Fixed Object Photo (FOP) (Onal, 2011).

Measurements and calculations

A scale of 200 cm was fixed just front of camels and then photos were taken by using a digital camera (Fuji S 5500 Finepix). The scale of 200 cm was divided into 4 parts and each part was 50 cm. Images of camel were printed out and then each distances of WH, BL, LL and diameter of cannon bone were measured by using a ruler which was specially graduated into millimetres.

WH: Vertical distance between the highest point of shoulders (withers) and level surface.

BL: Horizontal distance between *Caput humeri* and *Tuber ischia* (Raziq, 2011).

LL: Sternal pad distance from the ground (Khan, 2003).

CC: Peripheral distance around cannon bone (Raziq, 2011).

For each image a scale of 100 of 200 cm was measured and then both measurements were compared. Later then real measurement was calculated by using a simple formula (Onal, 2011).

$$M = 100 \text{ cm} \times dt/ds$$

M = distance of trait at real

dt = distance of trait on image

ds = distance of scale of 100 cm on image.

The measurements of cannon circumference were calculated by using the formula of length of circumference;

$$C = \pi d$$

C = circumference

π = Pi

d = diameter (Anonymous, 2012d)

Statistical analysis

Descriptive statistics for body dimensions were calculated using the Minitab 15 Statistical Software Program on the response variables of WH, BL, LL, and CC (Anonymous, 2012e).



Results and Discussion

Some results of body measurements were as given in Table 2.

Table 2. Descriptive statistics of the phenotypic traits in camels (cm).

Trait	WH	BL	LL	CC
	$\bar{X} \pm S_{\bar{x}}$	$\bar{X} \pm S_{\bar{x}}$	$\bar{X} \pm S_{\bar{x}}$	$\bar{X} \pm S_{\bar{x}}$
Overall mean (n=81)	161.7±1.42	146.1±1.36	81.9±0.84	16.3±0.24

WH= Withers height, BL=Body length, LL=Limb length, CC=Cannon circumferences.

The results from this study did not agree with the reported results of 193–213 cm and 182–196 cm for lowland and mountain type camels respectively from Wilson (1998), 220 cm from Khan et al. (2003) and 188 cm from Ishaq (2011) for withers height. Those results were higher than the results of present study. Only the Raigi camels were slightly higher than Turkish camels. Raziq et al. (2011) reported that withers height of Raigi camels was 164 cm.

In regard to limb length Raziq et al. (2011) reported that of 90 cm for Raigi camels and it was about 10% longer than Turkish camels. Raziq et al. (2011) also reported 20 cm for cannon circumference and this result was also about 4 cm larger than the result of Turkish camels.

According to those results, Turkish camels were smaller in body size than camels from Sudan and Pakistan. Nowadays, camel husbandry has not a significant role in Turkish farm animal husbandry. They are only raised for hobby or transportation for small distances. In this study camels were male and raised for camel wrestling. Camel owners always prefer large and heavy camels to win wrestling.

Conclusion

This study showed that Turkish camels are smaller in size than camels raised in Sudan and Pakistan. The Turkish camels represent a valuable genetic resource for present but their number decreases year by year. Owners of these camels should be supported by Turkish government symbolically and this genetic resource of Turkey should be conserved to survive for future generations.

References

- Aksu, A., 2004. An Evaluation on the Event Ifk. Cumhuriyet Üniversitesi, İlahiyat Fakültesi Dergisi, 8 (1): 1–21.
- Albayrak, I., Pamukoglu, N., Kaya, M.A., 2007. Bibliography of Turkish Even-Toed Ungulates (Mammalia: Artiodactyla). Munis Entomology and Zoology, 2 (1): 143–162.
- Anonim, 2001. Tekstil ve Giyim Sanayii Özel İhtisas Komisyonu Raporu. Sekizinci Beş Yıllık Kalkınma Planı, Başbakanlık Devlet Planlama Teşkilatı, DPT: 2549. ÖİK: 565, Ankara.
- Anonim, 2011. Türkiye İstatistik Kurumu, İstatistik Göstergeler 1923–,–2010, Yayın No: 3641, Başbakanlık, Ankara.
- Anonymous, 2012a. Türkiye İstatistik Kurumu, Tarım İstatistikleri Veri Tabanı, Başbakanlık, Ankara. http://www.tuik.gov.tr/VeriBilgi.do?alt_id=46 Erişim Tarihi: 23 Ekim 2012.
- Anonymous, 2012b. Camel Wrestling. <http://www.konakli.bel.tr/index.php?act=actvitishw> (erişim 04.02.2012).
- Anonymous, 2012c. www.googleearth.com (erişim 19.03.2012).
- Anonymous, 2012d. Circle. en.wikipedia.org/wiki/Circle#Length_of_circumference (erişim 19.03.2012).
- Anonymous, 2012e. Minitab 15, Statistical Computer Program.
- Arslan, M., 2011. Beyşehir Place Names and Their Contribution to Onomastic Science. Selçuk Üniversitesi, Sosyal Bilimler Enstitüsü, Konya, 25: 337–344.
- Aydin, G., 2003. Camel Husbandry (Unpublished PhD seminar), Selçuk Üniversitesi, Fen Bilimleri Enstitüsü, Konya, pps. 12
- Aypak, S., 2007. Helminth Infections of Camels. Türkiye Parazitoloji Dergisi, 31: 225–28.
- Azrug, A.F., Burgu, A., 2011. General Overview of Camel Parasites and the Situation in Turkey. Türkiye Parazitoloji Dergisi, 35: 57–60.
- Balaban, A., 2006. İskit, Hun Ve Göktürklerde Sosyal ve Ekonomik Hayat (Basılmamış Yüksek Lisans Tezi Tezi), Gazi Üniversitesi, Sosyal Bilimler Enstitüsü, Eski Çağ Tarihi Bilim Dalı, Ankara.
- Bhakat, C., Chaturvedi, D., Sahani, M.S., 2002. Camel versus Bullock Carting and its Economics in the Hot Arid Region of the Thar Desert. Draught Animal News, 3: 21–27.
- Bhakat, C., Chaturvedi, D., Sahani, M.S., 2003. An Economic Study of the Use of Draught Camels and Bullocks in Farming in the Thar Desert. Draught Animal News, 39: 19–24.



- Celik, A., 2004. Yeşilhisar (Kayseri) Carpet–Covered Pillows. *Ataturk Universitesi, Guzel Sanatlar Enstitusu Dergisi*, 13: 1–19.
- Cetin, O., Dumen, E., Kahraman, T., Bingol, E.B., Buyukunal, S.K., 2011. Selecting Slaughter and Hygiene of Sacrifice Animals. *Istanbul Universitesi Veteriner Fakültesi Dergisi*, 37 (1): 63–67.
- Çivi, H., 1995. Toplumsal, Kültürel ve Ekonomik Boyutlarıyla Ege-Aydın Yöresinde Deve Güresleri, Prof. Dr. Hasan Zafer Dogan Anı Kitabı, Der: Meral Korzay&Bülent Himmetoglu, Bogaziçi Üniversitesi Turizm İslatmeciliği Uygulama ve Arastırma Merkezi, Istanbul.
- Demirel, S., 2005. Tatavlatlı Mahremi, A Divan Poet of 16th Century and His Suttur–Name. *Milli Folklor Dergisi Uluslararası Halkbilimi Dergisi*, 65: 49–66.
- Emery, E., 2010. The Practical Camel and its Culture. *Le Monde Diplomatique*, Issue of 20 July 2010.
- Enderoğlu, Y.T., 2005. Aydın İlinin Ekonomik Kalkınması, İktisadi Araştırmalar Vakfı, Seminer kitabı, Şişli, İstanbul.
- Erden, H., Ocal, M.K., Guzel, N., Kara, E., Ogut, I., 1998. Macroanatomic Studies on the Stomach of Camel. *Veteriner Bilimleri Dergisi*, 14 (1): 97–105.
- FAO, 2011. Livestock data base. <http://faostat.fao.org/site/573/default.aspx#ancor> (accessed on 09.05.2011)
- Faye, B., Abdelhadi, O.M.A., Ahmed, A.I., Bakheit, S.A., 2011. Camel in Sudan: Future Prospects. *Livestock Research for Rural Development*, 23 (10), Article no: 219.
- Ishaq, I.A., Eisa, M.O., Ahmed, M.K.A., 2011. Phenotypic Characteristics of Sudanese Camels (*Camelus dromedarius*). *Livestock Research for Rural Development*, 23 (10), Article no: 219.
- Ila, S., 2007. Aisha and her role in political life after the prophet Muhammed. (Unpublished MSc thesis), Çukurova Üniversitesi, Sosyal Bilimler Enstitüsü, Adana.
- Kara, M., 2008. The Indirect Words Concerning Children in Turkmen. *Turkish Studies*, 3 (Fall 7): 413–19.
- Karakaş, G., 2010. Tokat İli Kentsel Alanda Et ve Et Ürünleri Tüketiminde Tüketici Kararlarını Etkileyen Faktörlerin Belirlenmesi Üzerine Bir Araştırma (Basılmamış Yüksek Lisans Tezi). *Gaziosmanpaşa Üniversitesi, Fen Bilimleri Enstitüsü, Tarım Ekonomisi Anabilim Dalı, Tokat*.
- Khan, B.B., Iqbal, A., Riaz, M., 2003. Production and Management of Camels. *Pak TM Printers, Faisalabad, Pakistan*.
- Kocan, N., 2007. Geleneksel Sporlarımızdan Ciritin Rekreasyon Amacı İle Günümüze Uyarlanması. *Adaptation of Traditional Jereed Game for Recreational Purposes. Spor Yonetimi ve Bilgi Teknolojileri Dergisi*, 2 (1): 31–39.
- Lattimore, O., 1967. *Inner Asian Frontier of China*, 1967, s. 73–74, Boston.
- Onal, A.R., 2011. Comparison Of Different Methods Which Are Used For Estimating Morphometric Parameters Of Cattle And Water Buffalos By Digital Image Processing Technology. (Unpublished PhD thesis), Namık Kemal Üniversitesi, Fen Bilimleri Enstitüsü, Tekirdag, pp 154.
- Öksüz, M., 2004. 1746–1789 Tarihleri Arasında Trabzon’da Sosyal ve Ekonomik Hayat (Basılmamış Doktora Tezi), Ankara Üniversitesi, Sosyal Bilimler Enstitüsü, Genel Türk Tarihi Anabilim Dalı, Ankara.
- Pradeep, D., Tiwari, G.S., 2005. Fatigue assessment of Bikaneri Camels in Field Work. *Draught Animal News*, 42: 17–22.
- Raza, S., Gondal, K.Z., Iqbal, A., 2004. *Draught Animal News*, 40: 33–39.
- Raziq, A., Tareen, A.M., de Verdier, K., 2011. Characterization and Significance of Raigi Camel, A Livestock Breed of the Pashtoon Pastoral People in Afghanistan and Pakistan. *Journal of Livestock Science*, 2: 1–9.
- Şeker, İ., Özen, A., Güler, H., Şeker, P., Özden, İ., 2011. Elazığ’da Kırmızı Et Tüketim Alışkanlıkları ve Tüketicilerin Hayvan Refahı Konusundaki Görüşleri, *Kafkas Univ Vet Fak Dergisi*, 17 (4): 543–550, Kars.
- Tiwari, G.S., Verma, R.N., Garg, R., Shrimali, H., Chaudry, J.L., 2004. Tractive Efforts of Various Draught Animals in India Conditions. *Bhakat, C., Chaturvedi, D. and Sahani, M. S. 2003. An Economic Study of the Use of Draught Camels and Bullocks in Farming in the Thar Desert. Draught Animal News*, 41: 36–44.
- Turangil, A.H., 2007. Words and Phrases Related with “Camel” in Kazak Turkish. *Marmara Üniversitesi, (Unpublished MSc thesis), Turkiyat Arastirmalari Enstitusu, Istanbul*.
- Türkdoğan, O., 2006. Türkiye’de Köy Sosyolojisi, *Iq Kültür Sanat Yayıncılık, İstanbul*.
- TurkStat., 2010. *Statistical Year Book 2010*. Turkish Statistical Institute, Prime Ministry, Ankara.
- Wilson, R.T., 1998. *Camels*. MacMillan Education limited, Hong Kong.
- Yarkin, I., 1965. *Goat–Camel–Pig Husbandry*. Ankara Üniversitesi Ziraat Fakültesi Yayinlari: 243. Ankara Üniversitesi Basimevi, Ankara.
- Yılmaz, O., Ertugrul, M., Wilson, R.T., 2011. The Domestic Livestock Resources of Turkey: Camel. *Journal of Camel Practice and Research*, 18 (1): 1–4.