

The Morphologic Traits of Donkeys Raised in East and Southeast of Turkey

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Abstract

This study was carried out to determine the morphological traits, distributions of body coat colour and body measurements of donkeys raised in the East and Southeast of Turkey by comparing with other donkey breeds of the world. For this purpose a total of 124 male and 70 female donkeys were measured. Descriptive statistics results yielded the following means: for withers height was 102.3 cm, height at rump 104.3 cm, body length 105.2 cm, heart girth circumference 113.5 cm, chest depth 45.7 cm, chest width 29.5 cm, cannon circumference 13.6 cm, head length 48.7 cm and ear length 21.9 cm respectively. In this study the body coat color frequencies among the donkeys were: mouse gray 31.4%, white 24.7%, black 23.7%, and brown 20.2%.

Key words: Donkey, morphologic trait, body measurement, body coat colour.

Türkiye'nin Doğu ve Güneydoğu Anadolu Bölgesi'nde Yetiştirilen Eşeklerin Morfolojik Özellikleri

Özet

Bu çalışma, dünyadaki diğer eşek ırkları ile karşılaştırarak, Türkiye'nin Doğu ve Güneydoğu'sundaki eşeklerin morfolojik özellikleri, vücut rengi dağılımı ve vücut ölçülerini belirlemek amacı ile gerçekleştirilmiştir. Çalışmada 124 dişi 70 erkek eşek ölçülmüştür. Tanımlayıcı istatistik değerler cidago yüksekliği 102.3 cm, sağrı yüksekliği 104.3 cm, vücut uzunluğu 105.2 cm, göğüs çevresi 113.5 cm, göğüs derinliği 45.7 cm, göğüs genişliği 29.5 cm, ön incik çevresi 13.6 cm, baş uzunluğu 48.7 cm ve kulak uzunluğu 21.9 cm olarak hesaplanmıştır. Bu çalışmada kullanılan eşeklerin vücut rengi dağılımı fare bozu % 31.4, beyaz % 24.7, siyah % 23.7 ve kahverengi % 20.2 olarak hesaplanmıştır.

Anahtar kelimeler: Eşek, morfolojik ölçü, vücut ölçüsü, vücut rengi

Introduction

The donkey or ass (*Equus asinus*) is an odd-toed ungulate and the smallest species in the Equidae family (Grinder et al. 2006). It is characteristically short-legged with exceptionally long ears. The word 'donkey' is of 19th century origin and refers only to the domesticated *Equus asinus*. Though the wild ancestor of the donkey is equally *Equus asinus*, it is usually known as the 'African wild ass', reportedly still extant. Donkeys may be the only hoofed animal domesticated exclusively in Africa. Like horses, they now come in a variety of sizes and breeds. In many countries the donkey is called 'the horse of the poor' (Yane and Burgue 2011) but in many important ways it is very different to a horse.

Donkeys in their nature are very friendly, calm, quite, patient, intelligent, cautious, playful, and eager to learn and enjoy the company of humans. They have great endurance. They are very cautious as well as agile on poor tracks. They are notorious for being stubborn, but

this is due to some handlers' misinterpretation of their highly-developed sense of self preservation. Donkeys are hardy and will live longer than other species in the same conditions. Donkeys can resist water deprivation and have a lower water requirement per unit of weight than other domesticated animals, except the camel (Yarkin 1962, Jones 2007, www.nationmaster.com 2011, www.en.wikipedia.org 2011). Donkeys normally consume no more than 10 litres a day. A pregnant, lactating, or working donkey in a hot and dry environment may, however, consume about up to 20 litres a day (Jones 2007).

Draught animals, such as horses, mules, donkeys, camels, cattle and water buffalo, play a major role in the economy of developing countries by being the main source of power in transport and traction, and performing as race animal, while providing manure, skin, hide s. Donkey breeding has lots of advantages. A donkey is comparatively cheap to buy. They are friendly towards humans and willing to work. They can turn in a small space and are easy to train. Donkeys need little

supervision in work. They can utilise poor food well and need little water. Donkeys are not affected much by external parasites and live/work long years in good care. They have less impact on soils than cattle or machines and can survive droughts better than cattle. Donkeys are useful for calming, training and guarding other kinds of animal. They work better in pairs with a friend (Jones 2007, www.nationmaster.com 2011).

In Turkey donkeys are used for pack transport and riding to ease the physical burden on humans. Donkeys carry firewood, water, grains, hay, and goods in short distances. They escort sheep flocks and carry goods for shepherds, and often a newborn lamb which cannot follow the flock. Turkish donkey owners rarely use their donkeys for ploughing, planting, and cultivating or cart traction. Donkey owners are often smallholders and poor people who cannot care for or feed their donkeys. Most of donkeys therefore scavenge on what plant matter is available. Hence Turkish donkeys are in small size and bad body condition. Donkey foals especially are fed inadequately, so they cannot grow well.

Obviously people replace animals when motor power is available, affordable, profitable and socially acceptable (Yarkin 1962).

Several researchers have reported data related to body length and height, as seen in Table 1. Some measured weights are given separately.

Barzev (2004) reported from Hadzidimitrov (1953) that Bulgarian local donkeys were of the Mediterranean type. They could reach up to 100-120 cm in height. Cyprus donkey breeds could reach up to 140 cm in height and the Martina Franca donkeys could reach up to 150 cm in height. Aganga (1994) reported that donkeys were widely used in Botswana. Most farmers owned up to five donkeys and some had herds of more than 20 donkeys. Botswana donkeys were small in body size and the mean body weight of adult donkeys was about 140 kg. Wilson (2000) worked on Zimbabwe donkeys, and they were typical African donkeys. Their colour was usually grey with a black dorsal stripe and

shoulder cross, but mealy-coloured around the mouth and the inguinal region. They had brown patches at the base of their ears. Zimbabwe's donkeys were obviously larger than those in much of the remainder of Africa. Their average weights were about 140 kg in the range 78-222 kg and withers heights of 105 cm in the range 94-120 cm. Pearson and Ouassat (1996) estimated the live weight and body condition of working donkeys in Morocco, using heart girth circumference length. Moroccan donkeys were a good cross-section of the various types of donkeys to be found in the region. Their live weight ranged from 74 to 252 kg, height at withers from 82 to 129 cm and body length from 64 to 106 cm.

The aim of this study is to define morphological traits of donkeys raised in East and Southeast of Turkey and to compare with other donkey breed of the world.

Materials and Methods

Experimental animals

In this research 194 (124 male and 70 female) donkeys aged between one and 15 years were analyzed, with data collected from Agri (39° 43'N; 43° 03'E), Ardahan (41° 06'N; 42° 42'E), Erzurum (39° 54'N; 41° 16'E), Hakkari (37° 34'N; 43° 44'E), Kars (40° 36'N; 43° 06'E), Mardin (37° 19'N; 40° 44'E), Sanliurfa (37° 09'N; 38° 49'E), Sirnak (37° 31'N; 42° 27'E) and Van (38° 30'N; 43° 22'E) in East and Southeast of Turkey (www.googleearth.com 2011). This research was carried between October 2010 and February 2011.

Measurements

Linear measures such as withers height (WH), height at rump (HR), body length (BL), chest depth (CD), and chest width (CW) were measured using a measuring stick. Other linear measures such as heart girth circumference (HGC), cannon circumference (CC), head length (HL) and ear length (EL) were measured with a specially graduated metal measuring tape (Sönmez 1973). The ages of donkeys were determined from the donkey owners.

Table 1. Some body length and height sizes from different countries on donkeys.

Origin of Donkey Breed	Height at Withers (cm)	Body Length (cm)
Bulgaria (Barzev 2004)	100-120	-
Cyprus (Barzev 2004)	Max. 140	-
Martina Franca (Barzev 2004)	Max. 150	-
Botswana (Aganga and Maphorisa 1994)	Max. 110	-
Zimbabwe (Wilson 2000)	105 (94-120)	-
Morocco (Pearson and Ouassat 1996)	82-129	64-106

Statistical analysis

Collected data were analyzed with the Minitab 15 statistical software program. Descriptive statistics for body dimensions were analyzed using ANOVA and Student's t-test that also determined the impact of sex, region, body coat colour, and age group on the response variables of WH, HR, BL, HGC, CD, CW, CC, HL and EL (Anonymous 2011).

Results

Descriptive statistics for morphological traits are given in Table 2. Concerning the effect of sex on phenotypic traits analyzed, t-Test results show that there are significant differences between male and female donkeys for WH, HR, CW, CC, HL, EL ($P<0.01$) and BL, HGC and CD ($P<0.05$). For all obtained results, whether significant or not, male donkeys yielded higher results than females.

The distributions of body coat colour are shown in Table 3.

Phenotypic correlation coefficients (r) among morphologic traits are given in Table 4. The highest values were found between WH and HR ($r = 0.97$) ($P<0.01$). Other high values were found between WH and BL ($r = 0.77$), WH and CD ($r = 0.70$), HR and BL ($r = 0.77$) ($P<0.01$). The correlation values of WH-CW, HR-CD, HR-CW, BL-CW, and HGC-CW also had high values those of higher than $r = 0.60$ ($P<0.01$). The lowest values was found between CD and CC ($r = 0.15$)

($P<0.05$). Other low correlation values were found between WH and HL ($r = 0.19$), HR and HL ($r = 0.19$), BL and HL ($r = 0.21$), CD and HL ($r = 0.24$), CW and HL ($r = 0.23$) ($P<0.01$). There were no negative correlations between all other traits, as can be seen in Table 4.

Discussion

The overall results yielded by this study (Table 2) agreed with those reported by Wilson (2000) of Zimbabwe donkeys and Pearson and Ouassat (1996) of Morocco donkeys. Aganga (1994) reported maximum 110 cm withers height for Botswana donkeys, which means those donkeys were somewhat smaller than Turkish donkeys. Barzev (2004) reported withers heights of 100-120 cm, so Bulgarian donkeys presumably had a mean height of 110 cm at withers. Thus Turkish donkeys are somewhat shorter than Bulgarian donkeys. The Turkish mean of 102.3 cm is near to lower limit of 100 cm for Bulgarian donkeys. Cyprus and Martina Franca donkeys (Barzev 2004) are much bigger than Turkish donkeys.

As seen from Table 1, there is only one body length result from elsewhere: 64-106 cm for Moroccan donkeys (1996). The Turkish result of 85-126 cm suggests that Turkish donkeys have longer body lengths than Moroccan donkeys, but they are also taller than Moroccan donkeys which have an average withers height of 95.5 cm.

Table 2. Descriptive statistics and comparison results of the phenotypic traits of donkeys for different sexes

Trait	WH (cm)	HR (cm)	BL (cm)	HGC (cm)	CD (cm)	CW (cm)	CC (cm)	HL (cm)	EL (cm)
	$\bar{X} \pm S_{\bar{X}}$	$\bar{X} \pm S_{\bar{X}}$	$\bar{X} \pm S_{\bar{X}}$	$\bar{X} \pm S_{\bar{X}}$	$\bar{X} \pm S_{\bar{X}}$	$\bar{X} \pm S_{\bar{X}}$	$\bar{X} \pm S_{\bar{X}}$	$\bar{X} \pm S_{\bar{X}}$	$\bar{X} \pm S_{\bar{X}}$
Overall (n=194)	102.3 ± 0.53	104.3 ± 0.50	105.2 ± 0.57	113.5 ± 0.49	45.7 ± 0.30	29.5 ± 0.24	13.6 ± 0.08	48.7 ± 0.22	21.9 ± 0.14
Sex									
Male (n=124)	102.7 ± 0.66a	105.0 ± 0.62a	105.2 ± 0.74a	113.3 ± 0.60	45.9 ± 0.37	29.6 ± 0.30a	13.6 ± 0.09a	49.0 ± 0.27a	22.0 ± 0.16a
Female (n=70)	99.7 ± 0.58b	102.4 ± 0.56b	103.1 ± 0.65b	111.7 ± 0.76	45.0 ± 0.35	28.4 ± 0.29b	13.3 ± 0.10b	47.5 ± 0.32b	21.3 ± 0.20b

a, b: $P<0.05$, c: $P<0.01$. *There were no significant differences between means showed by the same letters of alphabet in the same line and factor group.

Table 3. Distributions of body coat color

Color	Mouse Gray	White	Black	Brown
n	61	48	46	39
%	31.4	24.7	23.7	20.1

Table 4. Phenotypic correlation coefficients (r) between body measurements in donkeys

Traits	WH	HR	BL	HGC	CD	CW	CC	EL
HR	0.97**							
BL	0.77**	0.77**						
HGC	0.54**	0.55**	0.52**					
CD	0.70**	0.67**	0.55**	0.46**				
CW	0.64**	0.65**	0.62**	0.62**	0.43**			
CC	0.40**	0.42**	0.41**	0.41**	0.15*	0.43**		
HL	0.56**	0.57**	0.54**	0.49**	0.45**	0.52**	0.48**	
EL	0.19**	0.19**	0.21**	0.36**	0.24**	0.23**	0.37**	0.37**

*P<0.05, **P<0.01

It can be concluded that Turkish donkeys are small in size compared to the other types mentioned, except for the Moroccan ones. Donkeys raised in the south-east of Turkey are influenced by Iraqi and Syrian donkeys as dam or sire. In this region, the white body coat colour is common and the donkey is significantly larger than those in the east of Turkey. For future donkey breeding, donkeys from the south-east of Turkey donkeys provide a selection/breeding opportunity to obtain larger donkeys, if these are required.

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