

**SOME MORPHOLOGICAL TRAITS OF ARABIAN HORSES USED FOR JAVELIN SWARM (CIRIT) GAME IN ERZURUM**

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**ABSTRACT**

In Turkey Arab Horse are mainly used for race, but about 30 years they are also used for javelin swarm game in Erzurum. The aim of this study was to define body coat colour and some morphological traits of Turkish Arabian horses used for the javelin swarm (Cirit) game on horse in Erzurum. In this study a total of 90 Arabian horses, 87 males and 3 females, was analyzed in four age groups (3-4, 5-6, 7-8 and 9-13 years). Descriptive statistics gave the following means: withers height  $158.5 \pm 0.51$  cm, height at rump  $156.4 \pm 0.48$  cm, body length  $152.5 \pm 0.72$  cm, heart girth circumferences  $176.3 \pm 0.38$  cm, chest depth  $68.5 \pm 0.33$  cm, chest width  $39.5 \pm 0.26$  cm, cannon circumferences  $20.3 \pm 0.12$  cm, head length  $61.3 \pm 0.37$  cm and ear length  $14.9 \pm 0.15$  cm. In this study the frequencies of body coat colour of the sampled horses for gray colour was 53.4%, chestnut 33.3%, and bay 13.3%.

**Key words:** *Arabian; Javelin swarm; Morphologic trait; coat colour.*

**1. Introduction**

The horse (*Equus caballus*) is a large odd-toed ungulate mammal, one of the species of the genus *Equus* (Bennet and Hoffman 1999). Kafesoglu (1984) reported that the materialistic Turkish culture was based on invention of forging (wrought) iron and domestication of horse. According to some writers the horse was firstly domesticated by Turks in Middle Asia (Rasonyi 1971, Koppers 1941, Flor 1930, Schmidh 1946). During Gok-Turk Age they had 11 different kinds of horse breed (Liu 1958).

The Arabian or Arab horse is a breed of horse that originated on the Arabian Peninsula but the best Arabians were brought and bred in Anatolia by Turks. With a distinctive head shape and high tail carriage, the Arabian is one of the most easily recognizable horse breeds in the world (Gulec 2004).

**Table 1.** Some morphologic traits on Arabian horses.

*Çizelge 1-Arap atlarında bazı morfolojik özellikler.*

	WH (cm) $\bar{X} \pm S_x$	HR (cm) $\bar{X} \pm S_x$	BL (cm) $\bar{X} \pm S_x$	HGC (cm) $\bar{X} \pm S_x$	CD (cm) $\bar{X} \pm S_x$	CW (cm) $\bar{X} \pm S_x$	CC (cm) $\bar{X} \pm S_x$	HL (cm) $\bar{X} \pm S_x$	EL (cm) $\bar{X} \pm S_x$
Turkish Arabian (Batu 1931)	134.3 ± 0.80	137.1 ± 1.10	130.7 ± 0.13	144.7 ± 1.20	58.4 ± 0.50	32.1 ± 0.40	16.2 ± 0.18	51.8 ± 0.50	16.9 ± 0.30
Karacabey Yarımkan (Said 1940)	152.8 ± 0.26	-	147.8 ± 0.94	173.74 ± 0.87	66.9 ± 0.26	42.4 ± 0.37	18.9 ± 0.15	56.2 ± 0.20	19.0 ± 0.01
Female Arabian imported (Duzgunes 1953)	148.6 ± 0.37	148.0 ± 0.43	145.0 ± 0.47	162.4 ± 0.51	67.6 ± 0.21	36.0 ± 0.25	18.0 ± 0.08	52.6 ± 0.16	18.9 ± 0.10
Male Arabian imported (Duzgunes 1953)	152.6	151.4	147.2	169.3	68.8	40.6	19.1	54.6	14.6
Female Arabian raised in Sultansuyu (Duzgunes 1953)	149.2 ± 0.48	149.7 ± 0.58	144.5 ± 0.57	163.2 ± 0.66	67.3 ± 0.25	36.8 ± 0.39	17.9 ± 0.09	54.6 ± 0.21	15.5 ± 0.16
Female Arabian raised in Çifteler (Duzgunes 1953)	151.4 ± 0.56	149.6 ± 0.49	144.1 ± 0.56	169.1 ± 0.74	69.9 ± 0.33	38.3 ± 0.36	17.9 ± 0.10	55.1 ± 0.30	15.8 ± 0.17
Male Arabian raised in all stud farms (Duzgunes 1953)	151.7	151.6	147.0	170.3	68.6	41.5	18.8	54.7	15.0
Female Arabian raised in Urfa (Duzgunes 1953)	145.8 ± 0.45	145.6 ± 0.48	142.7 ± 0.53	163.2 ± 0.66	65.5 ± 0.53	34.5 ± 0.37	17.2 ± 0.12	55.0 ± 0.15	16.2 ± 0.17
Karacabey Yarımkan (Kaygusuz 2011)	152.1 ± 0.68			178,9 ± 2,06			19,1 ± 0,08		

WH= withers height, HR= height at rump, BL= body length, HGC= heart girth circumference, CD= chest depth, CW= chest width, LL= limb length, CC= cannon circumference, EL= ear length.

The main Turkish horse breeds are the Anatolian Native, Midilli of Ayvacik, Kula of Camardi, Canik, Cukurova, East Anatolia, Kolu Kisa of Hınıs, Karacabey, Malakan, Turkish Arab, and Uzunyayla Horses (Bayram et al 2005, Emiroglu & Yuksel 2002, Gulec 2002, Hendricks 1995). A group of coloured horse is focused in Ardahan and Kars provinces (Yılmaz 2011).

In Turkish literature there are several data on Arabian horses. Batu (1931), Said (1940), Duzgunes (1953) and Kaygusuz (2011) reported data for withers height (WH), height at rump (HR), body length (BL), heart girth circumference (HGC), chest depth (CD), chest width (CW), limb length (LL), cannon circumference (CC), and ear length (EL) were measured as seen in Table 1.

Erzurum is one of centre of the javelin swarm (Cirit) game on horse in Turkey. Until 1980s only native horses used to use for this game, but after 1980s Arabians used to use for this game. The speed of horse is the determinative factor of game result; therefore game players have started to use Arabians since 1980s. Arabian horses are commonly used for race in Turkey. After they are retired from race about 5-6 years of age, they are sold out. Cirit players buy those horses to play traditional javelin swarm game in Erzurum (Gezmiş 2011).

The aim of this study was to define body coat colour and some morphological traits of Turkish Arabian horses used for the javelin swarm (Cirit) game on horse in Erzurum.

## 2. Materials and Methods

### 2.1. Experimental animals

In this study a total of 90 Arabian horses, 87 males and 3 females, was analyzed in Erzurum (39°54'N; 41°16'E) in East Turkey (www.googleearth.com 2011). The sampled horses were aged between three and 13 years, grouped into four age groups of 3-4, 5-6, 7-8 and 9-13 years respectively. Traditionally almost all Cirit players keep only male horses to swarm game.

### 2.2. Measurements

This study was conducted between October and December 2010. Linear measures such as withers height (WH), rump height (HR), body length (BL), chest depth (CD), and chest width (CW) were measured using a measuring stick. Other linear measures such as hearth girth circumference (HGC), cannon circumference (CC), head length (HL) and ear length (EL) were measured with a specially graduated metal measuring tape. Horses were provided to stand on a hard, level surface. The traits measured were as follow:

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

HR: Vertical distance between the highest point of rump (*Tuber sacrale*) and level surface.

BL: Horizontal distance between *Caput humeri* and *Tuber ischii*.

HGC: Peripheral distance around chest just behind shoulders.

CD: Vertical distance between the highest point of shoulders (withers) and sternum.

CW: Horizontal distance on chest behind scapulas.

CC: Peripheral distance around cannon bone (third *metacarpal*).

HL: Distance between *Crista occipitalis* and *Os incisivum*

EL: Distance between base and point of inner side of ears (Sonmez 1973).

Ages were determined from the information given by owners.

### 2.3. Statistical analysis

The data were analyzed using 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).

### 3. Results and Discussion

In this study the frequencies of the different body coat colours were as given in Table 2. More than 50% of horses were gray coloured and one third was chestnut. The last colour of bay was just about 13.3%.

**Table 2.** Frequencies of body coat colour of Arabian horses.

*Çizelge 2-Arap atlarında don dağılımı.*

	Gray	Chestnut	Bay	Total
<b>n</b>	48	30	12	90
<b>%</b>	53.4	33.3	13.3	100.0

As seen in Table 3, between male and female horses there were significant difference for traits of WH and CC ( $P<0.05$ ). Results for WH, HR, CC, HL and EL males yielded higher values than females, but results for BL, HGC, CD, and CW males yielded lower values than females. As indicated in Table 3, the age effect was significant ( $P<0.05$ ) in WH. In the 3-4 and 7-8 year age group, Arabian horses were significantly different ( $P<0.05$ ) from the other two age groups for traits of WH.

**Table 3.** Descriptive statistics and comparison results of the phenotypic traits for different sexes, regions, and ages in Arabian horses.

*Çizelge 3- Farklı cinsiyet, bölge ve yaşlardaki Arap atlarında tanımlayıcı istatistik değerler ve karşılaştırmalı sonuçlar.*

Trait			WH (cm)	HR (cm)	BL (cm)	HGC (cm)	CD (cm)	CW (cm)	CC (cm)	HL (cm)	EL (cm)
Sex	Overall (n=90)		158.5 ± 0.51	156.4 ± 0.48	152.5 ± 0.72	176.3 ± 0.38	68.5 ± 0.33	39.5 ± 0.26	20.3 ± 0.12	61.3 ± 0.37	14.9 ± 0.15
	Male (n=87)		158.7b ± 0.44	156.5a* ± 0.49	152.3a ± 0.70	176.3a ± 0.26	68.5a ± 0.24	39.4a ± 0.22	20.4b ± 0.12	61.3a ± 0.36	14.9a ± 0.15
	Female (n=3)		153.3a ± 2.40	153.0a ± 0.11	159.0a ± 1.15	176.3a ± 3.84	69.3a ± 2.85	41.0a ± 1.53	18.5a ± 0.29	60.7a ± 0.88	13.8a ± 0.17
Age (Years)	3-4 (n=19)		156.9a ± 0.97	154.7a ± 0.76	151.4a ± 1.63	175.2a ± 0.70	69.0a ± 0.76	39.1a ± 0.45	20.1a ± 0.26	60.6a ± 0.58	14.6a ± 0.29
	5-6 (n=33)		159.5b ± 0.81	156.8a ± 0.92	153.8a ± 1.24	176.5a ± 0.42	68.2a ± 0.34	39.5a ± 0.32	20.6a ± 0.22	61.3a ± 0.71	15.1a ± 0.27
	7-8 (n=19)		157.3ab ± 0.61	156.2a ± 0.89	152.5a ± 1.14	176.6a ± 0.60	68.7a ± 0.53	39.3a ± 0.59	20.0a ± 0.23	60.5a ± 0.52	14.7a ± 0.23
	9-13 (n=19)		159.6ab ± 0.88	157.7a ± 1.07	151.6a ± 1.41	176.7a ± 0.50	68.3a ± 0.34	40.2a ± 0.46	20.3a ± 0.23	62.8a ± 0.66	15.2a ± 0.31

a, b:  $P<0.05$

\* There were no significant differences between means indicated by the same letters in the same column and factor groups.

WH= withers height, HR= height at rump, BL= body length, HGC= heart girth circumference, CD= chest depth, CW= chest width, CC= cannon circumference, HL= Head length, and EL= ear length.

Descriptive statistics yielded the following overall means for the sample: WH 142.9 cm, HR 142 cm, BL 146.1 cm, HGC 163.2 cm, CD 56.4 cm, CW 43.9 cm, CC 19.1 cm, HL 56.4 cm and EL 12.8 cm. For traits of WH, HR, BL, HGC, CC, and HL these results were higher than the results reported by Batu (1931), Said (1940), and Duzgunes (1953) for Arabian horses. On the other hand, results from this study were lower for the trait of EL as reported by Batu (1931), Said (1940), and Duzgunes (1953) and for the traits of WH and HGC as reported by Kaygusuz (2011) for Arabian horses. The only trait of CC agreed the result as reported by Kaygusuz (2011).

For the trait of CW Said reported lower value than this research, but Batu reported higher values than this study. Duzgunes (1953) reported higher values for male imported Arabian and male Arabian raised in all stud farm than this study, but reported lower values for female imported Arabian, female Arabian raised in Sultansuyu, female Arabian raised in Cifteler and female Arabian raised in Urfa.

For the trait of CD, Duzgunes (1953) agreed this study results for male Arabian imported and male Arabian raised in all stud farms. He reported higher values than this study for female Arabian raised in Cifteler and lower values than this study for female Arabian raised in Sultansuyu and female Arabian raised in Urfa. Said and Batu also reported lower values for Turkish Arabian and Karacabey Yarimkan horses than this study.

#### 4. Conclusion

It can tentatively be concluded that Arabian Horses now have larger body sizes than they had in last century. The present data demonstrate that the Arabian horse is a native Turkish horse breeds. This horse can be crossed to native Turkish horse breeds and a new type or breed can be created.

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