

Determination of mules raised in Ordu province

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Received: October 26, 2011, Accepted: February 21, 2012

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Abstract

This study was conducted to determine the morphological dimensions of mules raised in province of Ordu by analyzing sex, coat colour, and age by comparing with East Anatolian and UK mules. Data were analyzed for ANOVA and Student's T-Test using the Minitab statistical programme. In this study a total of 54 mules, 23 males and 31 females, were used in three age groups (3-5, 6-8 and 9-23 years). Descriptive statistics of morphologic traits were for withers height 125.5±0.67, height at rump 124.4±0.73, body length 130.1±0.84, heart girth circumference 152.3±0.76, chest depth 56.2±0.34, cannon circumference 16.6±0.16, and head length 55.8±0.26 cm. In this study the distributions of coat colour were for bay colour 38.9%, black 37.0%, gray 16.7%, chestnut 3.7%, and buckskin 3.7%.

Key words: Native farm animal, morphologic trait, body measurement, coat colour.

Ordu ilinde yetiştirilen katırların tanımlanması

Özet

Çalışmada kullanılan Ordu İlinde yetiştirilen katırlar cinsiyet, vücut rengi ve yaş faktörleri bakımından incelenmiş, ayrıca Doğu Anadolu ve İngiltere'de yetiştirilen katırlar ile karşılaştırılmıştır. Veriler, Minitab İstatistik Programı kullanılarak ANOVA ve Student's T-Test analizleri ile incelenmiştir. Çalışmada 3-5, 6-8 ve 9-23 olmak üzere 3 farklı yaş grubu altında, 23 erkek ve 31 dişi olmak üzere 54 katır kullanılmıştır. Morfolojik özelliklere ait tanımlayıcı istatistik değerler cidago yüksekliği 125.5±0.67, sağrı yüksekliği 124.4±0.73, vücut

uzunluğu 130.1±0.84, göğüs çevresi 152.3±0.76, göğüs derinliği 56.2±0.34, ön incik çevresi 16.6±0.16, ve baş uzunluğu 55.8±0.26 cm olarak bulunmuştur. Bu çalışmada vücut renginin dağılımı doru don % 38.9, siyah % 37.0, kır % 16.7, al % 3.7 ve kula % 3.7 olarak hesaplanmıştır.

Anahtar kelimeler: Yerli çiftlik hayvanı, morfolojik özellik, vücut ölçüsü, vücut rengi.

Introduction

A mule is not a genus, species or breed but a hybrid offspring of male donkey and female horse. Mules are used in place where horses and donkeys cannot be used efficiently. They are more patient, sure-footed, long-lived and hardier than horses. Mules are also less obstinate, faster, and more intelligent than donkeys (Yarkin, 1962; Anonymous, 2011a). The diploid chromosome number for horse is 64, that for donkey are 62 and that for the mule are 63 (Trujillo et al., 1991). Although both male and female mules have all genital organs, they are sterile and cannot give birth. There were only few evidence that mule reproduced (Benirschke et al., 1964; Jones, 1985; Rong et al., 1988).

Mules have some peculiar behaviour unlike other domestic animals. Undeserved reputation for bad temper is due to the mule's unexpectedly sensitive and untrusting nature. Until they have learnt to trust a person, they are worried that the person may do him harm. Under this situation they will take defensive action, never offensive, by kicking them, should he feel the occasion merits it. They are splendid and sharp kickers. Mules kick fast and accurately (Anonymous, 2011b).

In the last century mules were used to be raised in mountainous areas of Black Sea, Marmara Regions, and Taurus mountain range (Yarkin, 1962). Nowadays mules are mainly raised in provinces of Ordu, Van, Hakkari, Sirnak, Mardin, Icel, and Balikesir which have mountainous areas (Yılmaz, 2011). Mules are generally used by smugglers to carry some goods such as oil, sugar, rice between countries of Iran, Iraq and Türkiye in provinces of Hakkari, Mardin, Sirnak and Van illegally. In Icel and Balikesir they are used by farmers to carry wood stuff and goods. Nowadays Ordu mules are used to carry green tea leaf packs by tea producers.

In Turkish literature there was none of scientific research article or contribution on mules. Yarkin (1962), reported some information on mules but did not give any measurements. On body size of mules there was only data by reported Yılmaz (2011). Yılmaz searched mules in provinces of Hakkari and Van. He is compared to East Anatolian mules with UK mules that data were sent by the Donkey Sanctuary of UK (Anonymous, 2011c) (Table 1).

The aim of this study to determine morphological traits including body measurements, coat colours, and ages of mules which raised in Province of Ordu, Turkey.

Table 1. Some data on body sizes of mules from UK and Turkey.

| Source | WH** (\bar{X}) | HR (\bar{X}) | BL (\bar{X}) | HGC (\bar{X}) | CD (\bar{X}) | CC (\bar{X}) | HL (\bar{X}) | EL (\bar{X}) |
|-----------------------|-----------------------|---------------------|---------------------|----------------------|---------------------|---------------------|---------------------|---------------------|
| Anonymous (2011c)* | 120.4 | 121.8 | 122.6 | 147 | - | 14.8 | 55.2 | 19 |
| Yılmaz (2011) | 130.4 | 130.5 | 134.6 | 148.6 | 60.2 | 16.2 | 54.7 | - |

* The data of mules belonged to Miss Liz Hazell-Smith (Senior Research Assistant, www.thedonkeysanctuary.org.uk, UK) and data was sent via Miss Dr. Faith Burden (Head of Research, www.thedonkeysanctuary.org.uk, UK) (Anonymous, 2011c)

** WH= Withers height, HR=Height at rump, BL=Body length, Heart Girth Circumference, CC=Cannon Circumference, HL= Head length, and EL, Ear length.

Materials and Methods

Experimental animals

This study was carried out in November 2011. In this study a total of 54 mules, 23 males and 31 females, was analyzed in Province of Ordu (40° 58'N; 37° 55'E) (Anonymous, 2011d). The mules were aged from three to 23 years. They are grouped into three age groups of 3-5, 6-8 and 9-23 years. The ages of mules were determined from the information given by their owners.

Measurements

The mules were provided to stand on their four legs properly on a flat surface. Withers height (WH), height at rump (HR), body length (BL), and chest depth (CD) were measured using a measuring stick. Heart girth circumference (HGC), cannon circumference (CC), and head length (HL) were measured with a specially graduated metal measuring tape (Sonmez, 1973).

Statistical analysis

Data were analyzed using the Minitab 15 statistical software program. Descriptive statistics for body

dimensions were analyzed using ANOVA and Student's T-Test (Anonymous, 2011e) that also determined the impact of sex, coat colour, and age group on the response variables of WH, HR, BL, HGC, CD, CC, and HL.

Results and Discussion

The distributions of colour were as given in Table 2. It is determined that about three fourth of mules had bay and black coloured. The other three colours of gray, chestnut and buckskin were about one fourth.

Between male and females mules there was not a significant difference for all morphological dimensions as seen in Table 3.

The impacts of age and coat colour did not affect morphological dimensions and there were no significant differences among traits as given in Table 3.

Phenotypic correlation coefficient values (r) among morphologic traits were given in Table 4. There were significant differences among all phenotypic traits ($P < 0.01$). Only correlation coefficient values between BL and HL was $P < 0.05$ and rest of them were $P < 0.01$. The highest value was found between WH and HR ($r = 0.96$) ($P < 0.01$).

Other high values were found between HR-HGC ($r = 0.88$), WH-HGC ($r = 0.86$), CD-HL ($r = 0.84$), and BL-HGC ($r = 0.83$) those of higher than $r = 0.80$ ($P < 0.01$). The correlation coefficient values of WH-BL, HR-BL, WH-CD, HR-CD, HGC-CD, WH-CC, HR-CC, BL-CC, HGC-CC, CD-CC, WH-HL, HR-HL, HGC-HL and CC-HL also

had high results ($P < 0.01$). The lowest result was found between BL-CD ($r = 0.40$), and BL-HL ($r = 0.30$) those of lower than $r = 0.50$. There were no negative correlations among all other traits (Table 4).

Table 2. Distribution of body coat colour of mules.

| | Bay | Black | Gray | Chestnut | Buckskin | Overall |
|---|------|-------|------|----------|----------|---------|
| n | 21 | 20 | 9 | 2 | 2 | 54 |
| % | 38.9 | 37.0 | 16.7 | 3.7 | 3.7 | 100.0 |

Table 3. Descriptive statistics and comparison results in different sex, ages and body coat colours in mules.

| Trait | WH (cm) $\bar{X} \pm S_{\bar{X}}$ | HR (cm) $\bar{X} \pm S_{\bar{X}}$ | BL (cm) $\bar{X} \pm S_{\bar{X}}$ | HGC (cm) $\bar{X} \pm S_{\bar{X}}$ | CD (cm) $\bar{X} \pm S_{\bar{X}}$ | CC (cm) $\bar{X} \pm S_{\bar{X}}$ | HL (cm) $\bar{X} \pm S_{\bar{X}}$ |
|-------------------|--------------------------------------|--------------------------------------|--------------------------------------|---------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| Overall (n=54) | 125.5±0.67 | 124.4±0.73 | 130.1±0.84 | 152.3±0.76 | 56.2±0.34 | 16.6±0.16 | 55.8±0.26 |
| Sex | | | | | | | |
| Male (n=23) | 125.5±0.85 | 124±0.89 | 130.5±1.22 | 153.4±1.02 | 56.9±0.50 | 17±0.26 | 56.3±0.37 |
| Female (n=31) | 125.5±0.99 | 124.7±1.09 | 129.7±1.15 | 151.6±1.09 | 55.7±0.45 | 16.5±0.20 | 55.4±0.34 |
| Age | | | | | | | |
| 3-5 years (n=20) | 125.5±1.00 | 124.4±1.19 | 131.7±1.26 | 153.2±1.19 | 55.9±0.57 | 16.6±0.23 | 55.5±0.39 |
| 6-8 years (n=18) | 126.4±1.38 | 124.6±1.40 | 128.4±1.62 | 152.1±1.60 | 56.4±0.67 | 16.6±0.33 | 56.2±0.53 |
| 9-23 years (n=16) | 124.4±1.08 | 124.2±1.24 | 129.9±1.43 | 151.6±1.15 | 56.4±0.53 | 16.5±0.28 | 55.7±0.40 |
| Coat Colour | | | | | | | |
| Bay (n=21) | 126.1±1.16 | 125.2±1.19 | 130.4±1.30 | 153±1.20 | 56.5±0.53 | 16.6±0.29 | 56±0.42 |
| Black (n=20) | 126.1±0.91 | 124.9±0.98 | 130.9±1.40 | 153.4±1.12 | 56.6±0.57 | 16.8±0.22 | 55.9±0.44 |
| Gray (n=9) | 124.1±1.89 | 122.7±2.15 | 128.2±2.24 | 149.9±2.15 | 55.7±0.80 | 16.5±0.42 | 55.8±0.49 |
| Buckskin (n=2) | 119±1.00 | 116.5±0.50 | 123±0.01 | 143.5±1.50 | 54.5±0.50 | 16±0.50 | 54.5±0.50 |
| Chestnut (n=2) | 127±3.00 | 126±5.00 | 133.5±2.50 | 154.5±1.50 | 54±3.00 | 15.5±0.50 | 53.5±1.50 |

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 column and factor group.

Table 4. Phenotypical correlation coefficient values (r) between body measurements in mules.

| Traits | WH | HR | BL | HGC | CD | CC |
|--------|--------|--------|--------|--------|--------|--------|
| HR | 0.96** | | | | | |
| BL | 0.63** | 0.70** | | | | |
| HGC | 0.86** | 0.88** | 0.83** | | | |
| CD | 0.64** | 0.64** | 0.40** | 0.50** | | |
| CC | 0.53** | 0.53** | 0.51** | 0.53** | 0.63** | |
| HL | 0.67** | 0.62** | 0.30* | 0.50** | 0.84** | 0.75** |

* $P < 0.05$, ** $P < 0.01$

In this study bay and black colour are the most frequent colour. This result may quite be accepted as normal, because Thiruvankadan (2008), reported that among the basic colours of horse, bay was the most frequent colour and it was present in all the breeds except Friesian, Fjord, Percheron, Haflinger and Suffolk Punch.

According to Yilmaz (2011), mules raised in East Anatolia of Türkiye were not produced in Türkiye and all mules were imported from north of Iraq region. Those mules were produced by using large Iraqi donkeys as sire line. Hence, Iraqi mules were larger than other mules and were preferred by Turkish farmers. The mules raised in province of Ordu were produced locally by using native horse and donkey breeds as sire and dam lines. For the traits of WH, HR and BL Ordu mules were smaller in body size than East Anatolian mules but larger than UK mules. On the other hand for the traits of HGC, CC and HL, Ordu mules were larger in body size than East Anatolian and UK mules. For the trait of CD Ordu mules had lower value than East Anatolian mules. The donkeys which are used as sire line in Ordu are smaller than Iraqi donkeys. It might be a reason of being Ordu mules smaller in size than Iraqi mules.

In this study mules which were younger than 3 year-old were not used. All mules were 3 years old age and more. After 3 years of age there was no significant difference among 3-5, 6-8 and 9-23 years groups (Table 3). It showed that growing nearly completed until 3 years of age and then there was a small difference.

The present data demonstrated that mules raised in province of Ordu were slightly smaller in body sizes than East Anatolian Mules but larger than UK mules.

Acknowledgements

The authors gratefully thank Miss Liz Hazell-Smith (Senior Research Assistant, the Donkey Sanctuary, UK) and Miss Dr. Faith Burden (Head of Research, the Donkey Sanctuary, UK) for sending data on mules which provided us to compare to Turkish mules. We would like to thank managers of Ministry of Food, Agriculture and Livestock branch in Ordu Province for providing vehicle and helping to find mules on the area. We would also like to thank Dr.

Peta A. Jones (Donkey Power, South Africa) for her constructive comments, careful scientific revision and English edit.

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