

## The use of mules in Eastern Turkey

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**ABSTRACT:** In history mules used to be used widely in Turkey. After mechanization started in the mid-1900's, the numbers of the mule population decreased year by year. Engine vehicles such as tractors substitute not only mules but also camels, donkey and horses in rural areas. The mules are raised in provinces of Sirnak, Mardin, Hakkari and Van in the southeast and east of Turkey. All the mules are illegally imported from Iraq. The provinces of Sirnak and Mardin are next to Iraq border, and Van is next to Iran border. The province of Hakkari has border to both Iraq and Iran. In these provinces mules are only raised places which are close to country border.

In these provinces mules are only used for border trading between two countries. Mules carried food stuff such as sugar from Turkey to those countries and they brought fuel-oil from Iran, and some items such as cigarette from Iraq. Mules are escorted by owners in Iraq border, but mules are released in Iran land which is near to Turkish border and they arrive to Turkish land on their own. These clever animals definitely know the track and find their way in night time. Turkish borders are guarded by army soldiers and in Turkey there are not a special border guards. Because of European Union membership process, Turkish Government will provide special border guards in several years. In these border provinces geographical conditions are too harsh and therefore there is limited arable land and animal husbandry. Local people have low education and income. Hence some of them prefer border trading between two countries.

**Keywords:** *E. mulus*, genetic resource, border trade, Iraq, Iran.

## INTRODUCTION

A mule is a crossbred hybrid of the species of donkey and horse. In the world mules are known as patient and sure-footed animals. They are also sturdy, long-lived, stubborn animals (Yarkin 1962, [www.britishmulesociety.org.uk](http://www.britishmulesociety.org.uk)2011<sup>a</sup>). even though the diploid chromosome number is 64 for horse and 62 for donkey, mule have 63 chromosomes (Trujillo 1991). Hence both male and female mules are sterile and cannot reproduce, although they have all genitals. There were only few evidence that mule reproduced (Anderson 1939, Jones 1985, Anonymous2011<sup>a</sup>, Anonymous2011<sup>b</sup>).

About 100 years ago in Turkey mules 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.

**Table 1.**Body sizes of mules which are under protection of the Donkey Sanctuary of UK\*.

### [INSERT TABLE]

\* The data of mules belonged to Liz Hazell-Smith (Senior Research Assistant, [www.thedonkeysanctuary.org.uk](http://www.thedonkeysanctuary.org.uk), UK) and data was sent via Dr. Faith Burden (Head of Research, [www.thedonkeysanctuary.org.uk](http://www.thedonkeysanctuary.org.uk), UK) (Anonymous,2011<sup>c</sup>)

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

Either in Turkish or in world literature there were none of scientific contributions on mules related with body sizes. The only Yarkin (1962) reported some information on

mules but did not give measurements. There were also none of data on body sizes of mules, but some data were got via personal communication from the Donkey Sanctuary of UK (Table 1). The data were on five mules.

The aim of this study which is the first in Turkish literature on mule phenotypic traits is to determine phenotypic traits including body measurements and coat colour of mules which raised in East of Turkey.

## **MATERIALS and METHOD**

### **Experimental animals**

In this study a total of 89 mules, 45 males and 44 females, was analysed in Van (38°29'N; 43°21'E), and Hakkari (37°34'N; 43°44'E) in East of Turkey (Anonymous<sup>d</sup> 2011). The mules were aged from four to 16 years. They are grouped into three age groups of 4-6, 7-9 and 10-16 years.

### **Measurements**

The study was carried out between November 2010 and January 2011. 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). Ages were determined from the information given by owner of mules.

### **Statistical analysis**

Data were analysed using the Minitab 15 statistical software program. Descriptive statistics for body dimensions were analysed using ANOVA and Student's T-Test (Anonymous<sup>e</sup> 2011) that also determined the impact of sex, province, body coat colour, and age group on the response variables of WH, HR, BL, HGC, CD, CC, and HL.

**Table 2.** Distribution of body coat colour of mules.

[INSERT TABLE]

## **RESULTS**

The distributions of bay colour were 61.8%, mouse gray 23.6%, black 9.0%, chestnut 3.4%, and isabelline 2.2% as given in Table 2. It is clearly defined that about 62% of mules had bay coloured and about 24% of mules had mouse gray colour. The other three colours of black, chestnut and isabelline were about 14%.

As seen in Table 3, between male and females mules there was not a significant difference for morphological dimensions except the BL, HGC and CC. For the traits of BL, and HGC male mules had lower values than female mules had but for CC male mules had higher values than female mules had.

**Table 3.** Descriptive statistics and comparison results of the phenotypic traits in different sex, regions, ages and body coat colours in mules.

[INSERT TABLE]

\* There were no significant differences between means showed by the same letters of alphabet in the same column and factor group.

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

For body coat colour there was no significant difference among mules except the trait of BL. Mules in isabelline colour yielded the lowest and mules in black colour yielded the highest values.

Phenotypical correlation coefficients ( $r$ ) among morphologic traits were given in Table 4. The highest value was found between WH and HR ( $r = 0.93$ )( $P < 0.01$ ). Other high values were found between WH and BL ( $r = 0.63$ ), WH and HGC ( $r = 0.62$ ), WH and CD ( $r = 0.65$ ), HR and BL ( $r = 0.65$ ) those of higher than  $r = 0.60$  ( $P < 0.01$ ). The correlation values of WH-HL, HR-HGC, HR-CD, HR-HL, BL-HGC, BL-CD, BL-HL, HGC-CD, CD-HL and CC-HL also had high values ( $P < 0.01$ ). The lowest value was found between HGC and HL ( $r = 0.22$ )( $P < 0.05$ ). There were no negative correlations between all other traits, as seen in Table 4.

Table 4. Phenotypical correlation coefficients ( $r$ ) between body measurements in mules.

[INSERT TABLE]

## DISCUSSION

In this study bay colour is the most frequent colour. Thiruvankadan (2008) reported that among the basic colours of horse, bay is the most frequent colour and it is present in all the breeds except Friesian, Fjord, Percheron, Haflinger and Suffolk Punch. Mule is an offspring of a male donkey and a female horse. Hence it can be concluded that as a most frequent mule colour the presence of bay colour in Turkish mule is seemingly quite normal. In this study the second most frequent colour is mouse gray. Mouse gray is not a frequent colour in horses (Thiruvankadan 2008) but it is quite common among mules and donkeys.

Sample mules were raised in two adjacent provinces. There were no significant differences in mules raised in provinces of Hakkari and Van. According to mule owners none of mules were produced in Turkey and all mules come from north of Iraq. Mules are produced by using huge Iraq donkeys as sire line. Hence, Iraq mules are larger than other mules and are preferred by Turkish farmers. Hakkari and Van mules come from same source and they resemble each other, therefore there were no significant difference statistically.

In this study mules which were younger than 4 year-old were not used. All mules were 4 years old age and more. After 3 years of age there was no significant difference among 4-5, 6-8 and above 8 years groups (Table 2). It showed that growing nearly completed until 4 years of age and then there was a small difference.

Related with coat colour there was no significant difference among five coat colour all traits except the trait of BL ( $P < 0.05$ ). For the trait of BL two isabelline colour mules were the lowest value and eight black colour mules were the highest value. Colours of bay, mouse gray and chestnut were grouped in the middle.

As seen in Table 4, between all traits there were significant correlation ( $P < 0.01$  and  $P < 0.05$ ) except the trait of CC. The trait of CC had not any significant correlation to traits of WH, HR, BL, HGC, CD and HL.

The present data demonstrated that Turkish mules raised in provinces of Hakkari and Van are almost similar in body sizes. They are larger than mules raised in UK. , although the number of examples is only five

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