

Some morphological traits of Sudanese donkeys in Tamboul area, Sudan

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Abstract

This study was carried out to investigate some morphological traits of Sudanese donkey in Tamboul area. Also the study is aimed at studying the coat colors of donkeys in the area. To achieve such purpose two hundred working donkeys (122 male and 78 female) were used in the study. Six exterior measurements were taken from each donkey as follow: Height at withers, body length, head length, neck length, the back length and heart girth circumference. The main coat color of the donkeys was determined as part of the study and it was studied also. Linear measurements were measured using measuring stick and circumference was measured using measuring tape. This study is the first report which investigates the morphological characterization for Sudanese donkeys in Tamboul area based on some body measurements and coat color. Our comparative analysis of morphological parameters used in this study; such as a height at withers, body length, heart girth circumference, head length, neck length and back length; suggests that the Sudanese donkeys are typical African donkeys, while they are in the same height of Turkish donkeys but shorter than the Bulgarian donkey.

Keywords: sudanese donkeys, morphological traits, body coat colour, withers height

Introduction

Donkey (*Equus asinus*) is an odd-toed ungulate and the smallest species in the Equidae family (Grinder *et al.*, 2006) [4]. It is characteristically short-legged with exceptionally long ears (Ayad *et al.*, 2019) [2].

An estimated 39 million donkeys live in the developing world and 36% of this number is found in Africa (Swai and Bwanga 2008) [6]. The estimation of equine number in the Sudan is 750,000 donkeys, 26,400 horses and 630 mules (Wilson, 1981) [8].

Compared to other equidae species, donkeys contribute the major proportion of readily available transport needs of poor women and men living in hostile environments, enabling them to integrate into social and economic processes (Swai and Bwanga 2008) [6].

Several researchers have reported data related to body length and withers height. Barzev (2004) [3] 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. Botswana donkeys were small in body size and the mean body weight of adult donkeys was about 140 kg. Wilson [9] (2000) worked on Zimbabwe donkeys, and they were typical African donkeys. 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) [5] 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. Donkey 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 (Wilson 2000) [9]. Due to the scarcity of information about the donkeys in Sudan this study is designed to determine the morphological traits of work donkeys in Tamboul area, included some morphological traits, distributions of coat colour and body measurements of Sudanese donkeys and to compare with other donkeys breeds in the world.

Study area

The study was carried out in Tamboul area, east of Gezira state around 150 km south of Khartoum state.

Material and Method

Two hundred working donkeys both sexes (122 male and 78 female), aged between 2 to 15 years were studied. The following body measurements were measured using a measuring stick and measuring tape in circumference and recorded (Pearson and Ouassat, 1996) [5]:

Withers height: Measured with a measuring stick at the highest point of the withers with each donkey standing squarely on level ground with its head in a normal position.

Body length: Measured from the olecranon process of the elbow to the tuber ischii.

Heart girth: The circumference measured from the caudal edge of the withers around the girth behind the elbow.

Head length: Measured from top corners of the two nostrils, measure straight to the front of the poll.

Neck Length: Measured from poll to the withers, with your horse head level with the withers.

Back Length: Measured from withers to the croup. Tape won't touch the back except at the ends.

Statistical analysis

Data was analysed using SPSS software version 11.5 (SPSS, 2010). Descriptive statistics including frequencies (mean, standard deviation, percentage, Bar charts).

Results

Table (1) shows body measurements and it reflected that height at the withers was found to be 106.56±5.32, body length 106.64±6.82 cm, head length 43.02±2.04 cm, neck length 59.80±5.28 cm, back length 59.00±5.30 and heart girth 109.82±5.39 cm.

Table 1: Body measurements

Traits (N=200)	Withers height	Body length	back length	Head length	Neck length	Heart girth
Length (cm)	106.56±5.32	106.64±6.82	59.00±5.30	43.02±2.04	59.80±5.28	109.82±5.39
	32	6.82	30	04	28	39

The percentage of the coat color was shown in (Figure 1). It reflected that the grey and brown colors were found to be the most dominant colours at similar percentage for each 28.5%. While light brown colour found at the percentage of 19.5%, black colour 16.5 % and 7 % for the white colour.

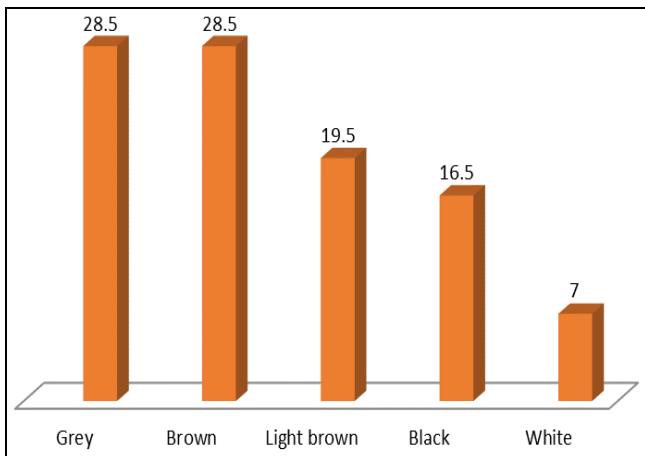


Fig 1: Percentage of the coat color.

Discussion

The aim of this study is to investigate some morphological traits, body measurements and also to study body coat colour of Sudanese donkeys in Tamboul area.

The overall results yielded (Table 1) agreed with those reported by Ayad *et al.*, (2019) [2] of Algeria's donkeys, Yılmaz and Ertuğrul (2012) [11] of Donkeys Raised in East and Southeast of Turkey, Wilson (2000) [9] of Zimbabwe donkeys and Pearson and Ouassat (1996) [5] of Morocco donkeys. Aganga and Maphorisa (1994) [1] reported maximum 110 cm withers height for Botswana donkeys, which almost similar to the results obtained in this study. Barzev (2004) [3] reported withers heights of 100-120 cm, so Bulgarian donkeys presumably had a mean height of 110 cm at withers. Thus Sudanese donkeys appear to be somewhat shorter than Bulgarian donkeys. The Sudanese donkey's withers height mean of 106.3 cm is near to lower limit of

100 cm for Bulgarian donkeys. Cyprus and Martina Franca donkeys (Barzev 2004) [3] are much bigger than Sudanese donkeys.

The present study revealed that the mean body length value is 106.64± cm. These results are strongly supported by findings of Pearson and Ouassat (1996) [5] reported the body length ranged from 64-106 cm for Moroccan donkeys. Yılmaz and Ertuğrul (2012) [11], who reported the body length 105.2 cm of donkeys in east and southeast in Turkey. It seems that Sudanese donkeys have body length similar to Moroccan and Turkey donkeys.

This study revealed that the mean heart girth circumference value is 109.82±5.39 cm. These findings are consistent with the findings of Yılmaz and Ertuğrul (2011) [10] reported that the heart girth circumference 111.5 cm, for Donkeys Raised in Iğdır, Turkey, Yılmaz and Ertuğrul (2012) [11], who reported the heart girth circumference 113.5 cm, of Donkeys Raised in East and Southeast of Turkey. This finding support the similarity between Sudanese and Turkish donkeys found in the body length value.

The results of survey revealed that the coat color was diversified with a predominance of brown and grey (28.5 %) for each colour following by light brown colour (19.5 %), black colour (16.5 %) and white colour (7 %). In another survey conducted in the in Kabylie area, Algeria, Ayad *et al.*, (2019) [2] reported a similar observation with the presence of three different classes of color of the studied donkeys. In Bulgaria, the coat color also varies where the more common colors are brown (57 %) and grey (Vleava *et al.*, 2016) [7]. While the body coat color frequencies the Turkish donkeys are: mouse gray, white, black and brown (31.4 %, 24.7 %, 23.7 % and 20.2 %, respectively) (Yimlez and Ertuğrul, 2012) [11]. Our results show the donkey coat colour was heterogeneous in Sudan. This difference of coat color could be attributed to ecological patterns.

Conclusions

It can be concluded that Sudanese donkeys in Tamboul area are same height of the Turkish donkey while shorter than the Bulgarian donkey. The grey and brown body coat colour is the most dominant colour in Sudanese donkey in Tamboul area.

Recommendations

We recommend that such studies should be carried thorough out the different regions of Sudan to determine the characters of the Sudanese Donkeys. Other measurements should be added to the future studies.

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