

Some Morphological, Fertility and Growth Traits for Mengali Sheep of Balochistan, Pakistan

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ABSTRACT: The present study was conducted to establish the characteristics regarding the habitat, status, norms and performance parameters of Mengali sheep breed of Balochistan. For the present study, 15 households of 7 villages were visited in 7 districts. Information on management, feeding, breeding, health practices, and utility patterns, productive and reproductive performance was collected by questionnaire and personal observations. Body weight and measurements were recorded for total 386 and 83 animals of extensive Farmers Flock (FF) and semi-intensive production system, Experimental Station CASVAB (ESC), Quetta, respectively. The data were analyzed using unpaired t- test. In both production systems, sex had a significant effect on growth performance ($P<0.05$). Average adult body weights for ESC and FF were 49.0 ± 0.51 and 40.4 ± 0.35 for male, and 41.2 ± 0.37 and 36.0 ± 0.21 kg for female, respectively ($P<0.05$). Male had higher height at withers height, chest girth and body length compared to female ($P<0.05$), whereas no significant difference was found in ear and tail length. No difference was observed in yearly greasy fleece weights. Averages of the twinning percentage for ESC and FF were 5.25 and 3.55% respectively. A ewe on an average delivers 6-9 lambs in lifetime. The variation in growth performance of sheep raised in different rearing systems could give remarkable clues in order to set genetic improvement plan by selection for a long term. The results suggested that the performance of the sheep was improved under semi-intensive management system, which indicates shortage of nutrients in the range, whereas in the semi-intensive conditions the feeding cost increased quite significantly.

Keywords: Mengali sheep, Balochistan, Fertility, Morphological characteristics

Balochistan (Pakistan)'ın Mengali Koyunlarının Bazı Morfolojik, Üreme ve Büyüme Özellikleri

ÖZET: Bu çalışma, Balochistan'ın Mengali ırkı koyunlarının yaşadığı yetiştirme ortamlarını, mevcut durumlarını ve performans parametrelerine ait özelliklerini belirlemek amacıyla yürütülmüştür. Bu çalışma için, 7 ilçede bulunan 7 köyün 15 hane halkı ziyaret edilmiştir. Bakım ve idare, yemleme, yetiştirme, sağlık uygulamaları, ve verim yönleri, verim ve üreme performanslarına ilişkin bilgiler, anket ve kişisel gözlemlerle toplanmıştır. Entansif üretim sisteminde yetiştirilen çiftçi sürülerinden (FF) 386 baş, yarı entansif üretim sisteminde yetiştirilen (CASVAB (ESC), Quetta) sürülerden 83 baş hayvana ait canlı ağırlık ve vücut ölçüleri kaydedilmiştir. Veriler, bağımsız t testi ile analiz edilmiştir. Her iki üretim sisteminde, büyüme performansı üzerinde cinsiyet önemli bir etkiye sahip olmuştur ($P<0.05$). ESC ve FF üretim sistemleri için ortalama ergin canlı ağırlıklar sırasıyla, erkeklerde 49.0 ± 0.51 ve 40.4 ± 0.35 kg, ve dişilerde 41.2 ± 0.37 ve 36.0 ± 0.21 kg bulunmuştur ($P<0.05$). Dişilerle karşılaştırıldığında, erkekler cidago yüksekliği, göğüs çevresi ve vücut uzunluğu bakımından daha yüksek değerlere sahiptir ($P<0.05$). Oysa kulak ve kuyruk uzunluğu bakımından önemli fark bulunmamıştır. İlk yaş kirliliği ortalamaları bakımından önemli bir fark gözlenmemiştir. ESC ve FF üretim sistemleri için ortalama ikizlik oranı sırasıyla % 5.25 ve % 3.55 bulunmuştur. Bir dişi koyun ortalama olarak 6-9 kuzu doğurmaktadır. Uzun dönemde seleksiyonla genetik ilerleme planı düzenlemek için farklı yetiştirme sistemlerinde yetiştirilen koyunların büyüme performansındaki varyasyon, yararlı bilgiler sağlayabilir. Sonuçlar, sahada besin kıtlığı olan yarı entansif sistemlerde koyunların performansının geliştirildiği, ancak besleme maliyetinin önemli ölçüde arttığı izlenimini vermiştir.

Anahtar kelimeler: Mengali koyunu, Balochistan, Üreme, Morfolojik özellikler

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INTRODUCTION

Population estimates in Pakistan for sheep are 27.8 million (GOP, 2009-2010). Isani and Baloch (1996) reported 31 sheep breeds, and Hasnain (1985) reported 28 fat and thin tail sheep breeds in Pakistan. Diversity among sheep breeds of Pakistan for various economic traits is quite high. Type of thin tail and fat tails also has a very wide variation (Khan et. al., 2007). The livestock census figures indicated to be an increasing trend of 0.12 % per annum during 1996-2010 in the sheep population of Pakistan. A similar trend was observed in the sheep rearing area of Balochistan (GOP, 2009-10). The increase in sheep population in this region may be attributed to farmers moving towards sheep rearing as well as agriculture.

Eyduran et. al. (2009) reported that for sheep breeding, animal productions such as meat and milk are very important for people's nourishment in all over the world. In order to improve meat production, some body measurements (withers height, body length, chest circumference, leg circumference, body depth, and width chest behind shoulders) obtained in early growth periods with body weight could provide useful information for early selection of the animals. They found that body weight increased with increasing these body measurements.

Mengali sheep is an important fat tail sheep breed of Balochistan which are black or brown with white patches on the body (Kakar and Ahmad, 2004; Khan et. al., 2007) but poorly documented and not recognized in the livestock census up till 2006 (GOP, 2006). The animals are well adapted to the local conditions of the most of the districts of Quetta, Khuzdar, Kalat, Mastung, Awaran, Nushki and Kharan of Balochistan province (Kakar and Ahmad, 2004). Source of origin of Mengali sheep is still unknown. This sheep breed is mostly raised by native Baloch tribe Mengal (most populated tribe of Kalat Division) therefore, the breed is known as "Mengali". The animals of the breed, isolated from other sheep breeds, are expected to have developed certain distinctive characteristics.

Sheep production in the province mainly depends on grazing by adopting transhumant production system. The ruminants depend on natural pasture and fibrous crop residues for their survival, growth, reproduction and production. Since quality and quantity of the natural pasture vary with season, animals dependent on it are subjected to nutritional stress. In winter the rangeland has less biomass available for animals and may not fulfill the animals' daily requirements which, leads

to decrease animal productivity in terms of meat and milk etc. Optimum growth can be obtained with suitable combination of concentrate and forage in the lamb's diet (Macit et al., 2001). The productive and reproductive performances of sheep are influenced by many factors, especially genetic potential of a particular breed, availability of nutrition and environmental factors (Kochapakdee et al., 1994).

It is a fact that extensive production is economically viable than semi-intensive system. Variations in productive and biometric performance were due to genetic potential of breeds and environmental factors (Rafeeq et al., 2010). The variation in growth traits among production system was reported by many researchers. They had compared the performance of sheep in different system and location and found that lambs kept under the semi-intensive conditions used by sheep producers exhibited better growth than those kept under the extensive system but its feeding and management cost was observed higher (Muska-Mugerwa et al., 2000; Bela and Aynalem, 2009). Akcapinar and Aydin, (1984) reported similar findings for Morkaraman and Tuj sheep of Turkey. For economical sheep production, it is necessary that every aspect of the production chain be addressed (Kakar and Ahmad, 2004). Due to recent development of new tools and technique in the modern husbandry practices, it is becoming relatively easier to explore the production potential of sheep (Charray et al., 1992).

Information on Mengali breed was scanty and its current population status was not known. To our knowledge, no available report on evaluation or improvement program for this breed has been found. Therefore, the aim of the present study was to establish the characteristics regarding the habitat, status, norms (morphological traits) and performance traits of Mengali sheep breed of Balochistan. Also, one of the other objectives of the present study was to evaluate this breed raised under extensive, Farmers Flock, (FF) and semi-intensive production system, Experimental Station CASVAB, (ESC).

MATERIALS AND METHODS

Base Line Study

The present study was conducted for six months (March 2006 to August 2006) in the Mengali sheep breed populated areas in seven (7) districts of Balochistan province (Quetta, Mastung, Kalat, Khuzdar, Awaran, Kharan and Nushki), seven (7) villages and 15 house-

Table 1. Data of seven districts of Mengali sheep habitat

District	Quetta	Mastung	Kalat	Khuzdar	Awaran	Kharan	Nushki
	N	N	N	N	N	N	N
7 Villages (15 House Hold)	15	15	15	15	15	15	15
Male	505	1295	1222	650	37	68	140
Female	1700	3325	2950	2354	224	363	486
Total No. of Animals	3205	4620	4172	3304	261	431	646

N = number of observations

Table 2. Comparison of Male at ESC and FF

Trait	ESC Mature Male (28) ¹		FF Mature Male (73) ¹	
	Mean± SEM	Range	Mean ± SEM	Range
Body weight (kg)	49.0±0.51 ^a	43-55	41.7±0.37 ^b	34-47
Body length (cm)	74.3±0.80 ^a	70-81	71.1±0.49 ^b	66-79
Height at wither (cm)	74.6±0.62 ^a	73-83	71.8±0.34 ^b	65-79
Chest girth (cm)	88.5±1.10 ^a	75-99	80.1±0.54 ^b	72-91
Ear length (cm)	18.1±0.58 ^a	13-24	17.8±0.26 ^b	12-24
Tail length (cm)	32.8±0.47 ^a	28-36	30.7±0.25 ^b	26-35
YGF ² (kg)	2.60±0.60 ^a	1.3-3.45	2.42±0.48 ^{ab}	1.2-3.1

¹= Number of animals in brackets; ²= Yearly greasy fleece weight (YGF)

Means followed by different superscript in the row are significantly different (P<0.05).

holds of each district respectively were visited (Table 1). In the present study, different questionnaire was designed to record the scientific data for the proposed project. Comprehensive information relating to habitat, status, norms, morphological characteristics, feeding, breeding, management, production performance, health practices, utility patterns and constrains of sheep (especially Mengali) rearing in the region were collected on (performance) questionnaire specifically design for this purpose. The priority was given to Mengali sheep rearing area of the selected districts to observe the influence of crossbreeding and know existence of indigenous breeds in each locality. Household were randomly selected. Secondary data on population statistics were obtained from district livestock offices. Variables included during the present study can be summarized as follows:

Qualitative (Morphological) Characteristics:

Sex, coat color pattern, coat type, horn shape and orientation, head profile, ear form of the animals were recorded.

Quantitative (Physiological) Characteristics:

Body weight and measurements of animals present at villages were taken randomly, information about wool and milk production was recorded.

Other Variables: Information on history of Mengali sheep, breeding practices, utility of sheep, production and management system, lambing history, twin-

ning percentage, season of birth, and fertility rate data were collected.

Body weight of all age groups and body measurements were recorded for 255 female and 131 male mature sheep (Table 2 and Table 3) in FF. In addition to this, 55 ewes and 5 rams of Mengali sheep purchased from the farmers that have the best pedigree records were maintained under semi-intensive condition during 2006-2009 and performance data were recorded from birth to maturity. Only data of adult 55 ewes and 28 rams, with different ages (22-26 months) were used for the present study at Experimental Station, Centre for Advanced Studies in Vaccinology and Biotechnology, (CASVAB) (ESC), University of Balochistan, Quetta (Table 2 and Table 3).

In addition to grazing, feed supplement, 3 kg green fodder and concentrate 0.400 kg/day was provided to the animals of ESC. The animals were weighed by sheep weighing balance (±500 gms). The biometry measurements were taken through the sheep measuring scale (±1cm). The significant differences were determined by *t*-test.

RESULT AND DISCUSSION

Growth Traits

In both production systems, sex had a significant influence on growth performance (P<0.05). Average adult body weights of ESC and FF were 49.0±0.51

Table 3. Comparison of Female at ESC and FF

Trait	ESC Mature Female (55) ¹		FF Mature Female (148) ¹	
	Mean± SEM	Range	Mean ± SEM	Range
Body weight (kg)	40.4±0.35 ^a	34-49	36.0± 0.2 ^b	30-44
Body length (cm)	70.5±0.54 ^a	66-79	68.6±0.29 ^b	61-77
Height at wither (cm)	70.5±0.42 ^a	63-81	67.9±0.25 ^b	62-79
Chest girth (cm)	80.4±0.70 ^a	72-94	76.2±0.33 ^b	65-86
Ear length (cm)	17.9±0.43 ^a	13-21	17.0±0.19 ^b	12-21
Tail length (cm)	27.8±0.32 ^a	19-31	27.2±0.16 ^b	19-31
YGFW ² (kg)	2.4±0.80 ^a	1.1-3.0	2.30±0.75 ^{ab}	1.0-3.1

¹= Number of animals in brackets; ²= Yearly greasy fleece weight (YGFW)

Means followed by different superscript in the row are significantly different (P<0.05).

Table 4. Means of body weight of male and female Mengali sheep at farmers' flocks (FF)

Age in months	No. obs ¹	Male (kg)		Female (kg)	
		Mean ± SEM	No. obs ¹	Mean ± SEM	No. obs ¹
At birth	35	3.40±0.80	27	3.10±0.80	
>1 to 2	77	12.50±0.80	63	9.80±0.80	
> 3to 6	233	22.50±0.80	183	19.50±0.80	
>6 to 9	110	25.00±0.80	148	21.00±0.80	
>9 to 12	122	31.00±0.80	151	28.50±0.80	
>12 to 30	82	40.50±0.80	165	34.00±0.80	

¹ No. obs. = Number of observations

and 40.4±0.35 for male, and 41.2±0.37 and 36.0±0.21 kg for female, respectively (P<0.05). The variation in growth traits between production systems was also in line with previous results of researchers. Previously, the performances of sheep in different system and locations were compared with each other and, it was found that lambs under the semi-intensive conditions used by sheep producers showed better growth than those under the extensive system, however, its feeding and management cost was detected to be higher, (Akcapinar and Aydin, 1984; Mukasa-Mugerawa et al., 2000; Bela and Aynalem, 2009; Rafeeq et al., 2010). Significant effect (P<0.05) of sex on mature body weight for the present study were also supported by previous researchers (Ahmad, 1982; Mehta et al., 1995; Sharif, 2001; Refik et al., 2009). Results of the present study indicated that male animals were heavier in weight compared to female ones in both production systems (semi-intensive and extensive). These results were in agreement with those reported by some authors (Movarogenis and Constantinos, 1986; Nawaz and Khalil, 1998; Rastogi, 2001).

Body Measurements

Male had higher height at wither, girth and length compared to female (P<0.05), whereas no significant difference was found in ear and tail length. No difference was observed in yearly greasy fleece weight. Averages of the twinning percentage for ESC and FF were 5.25 and 3.55% respectively. A ewe on an average delivers 6-9 lambs in lifetime.

Present results for body measurements confirmed findings of Acharya (1982) and Mehta et al. (1995), who analyzed the data on biometry, productive, reproductive performance and survival of (Juliann and Malpura) and (Sonadi) sheep of India respectively. They concluded that male sheep were heavier in weight and higher in body measurements (body length, withers height, chest girth) when compared to female ones.

Rafeeq et al. (2010), who evaluated the productive performance of the five breeds of sheep prevailing in different parts of the Balochistan province, observed to be significantly different among breeds (P<0.05) for withers height, body length and chest girth. Consistent growth performance was found in Mengali and Balochi compared to other breeds. They concluded that, genetic potential of breeds and environmental factors might lead to variations in productive and body measurements performance.

Morphological Characteristics

The results of the present study showed that, the main features of Mengali sheep breed are compact body with remarkable height, pendulous belly, fat tail, body color is black/tan or brown with white patches on the belly or vice versa (Kakar and Ahmad, 2004; Khan et al., 2007), black spots on the head, and ears are usually medium in size, big face with Roman nose, both males and females are polled. The results of mature body weights, body measurements and fleece weight of Men-

gali sheep maintained at the ESC and FF are presented for male and female in Table 2 and 3, respectively. It is a coarse fleece producer with a range of 1.0 to 3.40 kg per head per annum with mixture of 85% black and 15% white wool. It is also recorded that the productivity of breed is far below the genetic potential mainly due to the shortage of feed, poor management practices and unplanned breeding programmes. The production system is sedentary and transhumant, flocks are bred in September to November and lambing in spring from February to April. Estimated fertility rate range may be getting higher if the fodder availability is sufficient. It can further be increased if ewe flushing and extra feeding of breeding ram at least one month before the breeding season and as well as improvement in management practices. Morphological traits, fleece color, face size and shape, growth and reproductive performance and body measurements of Mengali sheep were found significantly different than other sheep breeds (Balochi, Beverigh, Rakhshani and Harnai) present in the area (Hasnain, 1985; Bhutto et al., 1993; Khan et al., 2007; Rafeeq et al., 2010).

Reproductive Performance

Breeding is by natural mating. Generally, one breeding male is maintained per flock. However in some of large size flocks, more than one male are kept for breeding purposes (one ram for 40 ewes). Other male animals are generally sold at 9-18 months for meat purposes. Average age at sexual maturity is 12-16 months for both males and females. Average age at first lambing was 19 to 25 months and lambing interval is of one year. A ewe, on average, delivers 6-9 lambs in her lifespan. Almost similar result was also reported by Acharya (1982). Mostly farmers bred the animals in October to November and lambing took place in February to March. During these months highest numbers of births were recorded. In the present study, the twinning ratio values for ESC and FF were estimated as 5.25% and 3.55% respectively.

Health Management

The majority of farmers do not vaccinate their sheep against common diseases mainly due to lack of awareness. Parasitic infection and Enterotoxaemia, pneumonia were reported as major diseases in the area. Lamb mortality, with an average of 10-15% and as high as 20%, was determined as the major health problem. Pneumonia was reported to be the main reason for lamb mortality in winter season and lamb dysentery in other

seasons. Abortions were reported in the months of November and December in 2-4% of cases.

The findings on perinatal mortality of animals of the present study were similar to the findings of many investigators. Acharya (1982) who reported mortality 10-20%, Stamp (1967) reported that perinatal mortality is a major cause of low productivity in sheep. In Britain, the average annual rate of perinatal mortality may be 15% or more (Barlow et al., 1987), and in Australia, lamb mortality of 15 to 20% has been reported, with 86.6% deaths occurring within the first three days of life (Dennis, 1974). Many infectious and non-infectious diseases causes of perinatal mortality are incriminated and the majority of abortions occurred in November, December (Mendel et al., 1989, Aldom et al., 2009).

Utility

Mengali sheep are maintained for mutton, milk and wool production. Sheep serve as a source of cash income, run the livelihood and as a business. Sheep predominantly slaughtered during festivals and religious occasions especially Eid-ul-Azha. Farmers utilize wool for making hand-knotted carpet and rugs and sold in to market for good price. In traditional system of Balochistan, Landi (Dried meat) is prepared for the consumption of meat during winter season. It is also one of the ways of preserving meat, whereas, other milk products like curd, lassi are used for their own consumption and butter milk, ghee, and Kurt (dry cheese) are sold in the local market.

Results of the present study regarding utility of Mengali sheep were in agreement with those of many researchers (Khan and Isani, 1994; Kakar and Ahmad, 2004; Khan et al., 2007; Eyduran et al., 2009) also documented that increasing human population demands more meat, milk, and other by products of sheep.

CONCLUSIONS

The results revealed from the present study that Mengali is a distinct sheep breed, with peculiar characteristics. It was determined that animals kept under the semi-intensive conditions exhibited better growth, however feeding and management cost was higher in semi-intensive system. It is also suggested that Mengali sheep are preferred due to its adoptability, good survival rate and growth performance. Further investigation/research is required to confirm and find out other aspects for the economical benefits of the Mengali breed.

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