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PERFORMANCE AND SPECIFIC CHARACTERISTICS OF BALOCHISTAN CAMEL BREEDS

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Abstract

This study is amid to evaluate the qualitative and quantitative performance of camels of Balochistan Pakistan. The key purpose was too disparate the focus of scientists, livestock policy makers and NGO's managers on this neglected species that is conferred with excavated potentials. Camel is one of the major and abundance species of province with 41% of total camel population of Pakistan. The recognized camel breeds of Balochistan are eight (Brahvi, Kachhi, Kharani, Lassi, Makrani, Rodbari, Pishin and Kohi breed) out of twenty (n=20) breeds of Pakistan. This study discovered that Kachhi breed is a riverine camel while other is mountainous camels. Rodbari breed had highest birth weight (48.58 kg) among other breeds while the weaning weight (118.83 kg) is high in Kharani breed and adult weight (712 kg) is high in Pishin breed. The milk yield per lactation (2049 liter) is high in Kachhi breed and lactation length (579.18 days) is high in Brahvi breed. Age of puberty female camel (1282.6 days) and age of first breeding (1575.7 days) are delay in Brahvi breed. Gestation period (405.53 days) is high in Makrani breed and dry period (369.12 days) is long in Brahvi breed. Calving interval (787.65 days) is long in Rodbari breed. Age at puberty for male camel is long in Pishin breed and peak rutting vigor (128.54 days) is more in Kohi breed. Duration for copulation (25.38 mints) is high in Brahvi breed. The study is concluded that camel is most important specie arid, semi-arid and desert areas like in Balochistan. The camel of this province can be improved with application of specific latest molecular etchings regarding selection breeding programs which can cover the delay maturity, low conception rate and long calving interval period.

Keywords: *Balochistan, Camel Breeds, Management, Pastoral, Performance*

INTRODUCTION

The conservation, protection, reproduction and nurturing of indigenous livestock breeds are necessary, as they are assumed to be the most important national assets of each country (1). In survival strategies keeping of multipurpose livestock species are essential component which communities have developed to deal with extreme climatic and environmental condition. Keeping a verity of local livestock breeds is decisive to food security, reducing poverty and sustainable development. The conservation of these locally adopted livestock breeds is very much in the interest of developing countries both for present and future food security. Growing incomes is directly proportional to demand for specialized foods produced by diversification of animal's production systems (2). Arabian or one humped (Camelus dromedarius) is a precious livestock species particularly adapted to hot and arid environment. It is a

multipurpose animal provides milk, meat, wool, hair and hides. Camels are also used for ridding, as a beast of Burdon and a draught animal for agriculture operations and short distance transports. They are suitable domestic animals in the desert with long, dry hot periods of eight months and limited erratic rainfalls between 50 to 55 mm (3). Conversion of scanty plants into milk, meat and fiber represent it versatility. In comparison to other animals, camel eats less, sleeps in short intervals and has a long-lasting memory (4,5,6). Camels are ideal for pastoralist as they yield milk in all seasons when other animals stop milking during dry periods. For per kg milk production the intake of camel is very low, requires only 1.9kg of dry matter as compared with cows requires 9.1kg of dry matter for production of per liter milk (7).

Camels concerned with family "Camelidae" which possess three Geniuses, 1-Camelus, 2-Lama, 3-Vicugna and seven species. Genus Camelus contributes three species; the 1st one is the one humped or Arabian or Dromedary camel while the 2nd is called two humped or Bactrianus camel, 3rd one is Bactrian ferus. Genus Lama comprises two species, a-Lama glama, b-Lama guanaco. The Genus Vicugna has also two specie called Vicugna and Vicugna Pacose (8).

Worldwide camel population is about 35 million (9). Out of these Africa accounts 85% camels while Asia shares 15% camels. From African camels, 70% found in Somalia, Sudan, Ethiopia and Kenya, 15% of African camels roamed in Chad. Some camels also found in other regions of the world which may be few thousand. Dromedary or one humped camel contributes 94% of total world camel population whereas Bactrian or two humped camels participate only 6% which are roamed specially in Asia (10). Asia is the 2nd largest host of camel population in the world. Both Dromedary and Bactrian camels found in Asia. Pakistan and India comprise 70% of Asian camels. Pakistan is the house of about 1.1 million camels and Balochistan is the richest province with 41% of camel population while in 2nd number Sindh stands with 30% of camel heads followed by Punjab and KPK with 22% and 7% respectively (11).

METHODOLOGY

Present study was carried out on Balochistan camel breeds to observed phenotypic characteristics and to assess their performance traits in Balochistan province of Pakistan.

SELECTION OF ANIMALS

Total (n=240) camels were selected from all 8 breeds (Brahvi, Kachhi, Kharani, Lassi, Makrani, Rodbari, Pishin and Kohi breed) of Balochistan. About 30 camels of each breed from their home tracts include 5 camels from each herd of different villages of same Districts. Camels were selected randomly from 8 home tract districts (Chaghi, Kharan, Lassbela, Punjgoor, Gawdar, Kohlue, Dader and Pishine). A very comprehensive information regarding their habitats, feeding, breeding, housing, management, production system, health/vaccination, utility patterns and constraints like poor selection, feeding and management system was collected. Qualitative (morphological) characteristics included sex, coat colour, body shape, head, ears, eyes, muzzles, mouth, hind quarter, shoulder, chest, legs and foots. Quantitative (physiological) characteristics comprises growth traits of female camels (n=136) and males (n=104), somatometric measurements include girth, height, length, foreleg (length) and hind leg (length). Production traits, e.g., milk yield per lactation (lit), lactation length (days), quantity of hair production (kg) and meat production (dressing %). Female reproductive traits consist of age at puberty (days), age at first breeding (days), gestation period (days), dry period (days), number of calves during life, calving intervals (days) and reproduction span (yrs.).

The biometry (body parts measurements) was conducted with a tape meter of the mature animals of each breed in the morning time when their bellies were empty. No pregnant animal was included in this study. Each animal was measured with in a limit of 10 minutes and the other person was writing the measurements. The animals were measured from the left side to keep the data homogenized. The animals were placed on a smooth place and were measured with a tape measure.

DATA ANALYSIS

Data of this study were analyzed using simple descriptive statistics, independently for the male and female study groups. Student's *t*-test for the rating data and Fisher's exact test for count data were performed for associations between the female and male groups. For all statistical tests, 0.05 was used as significant level.

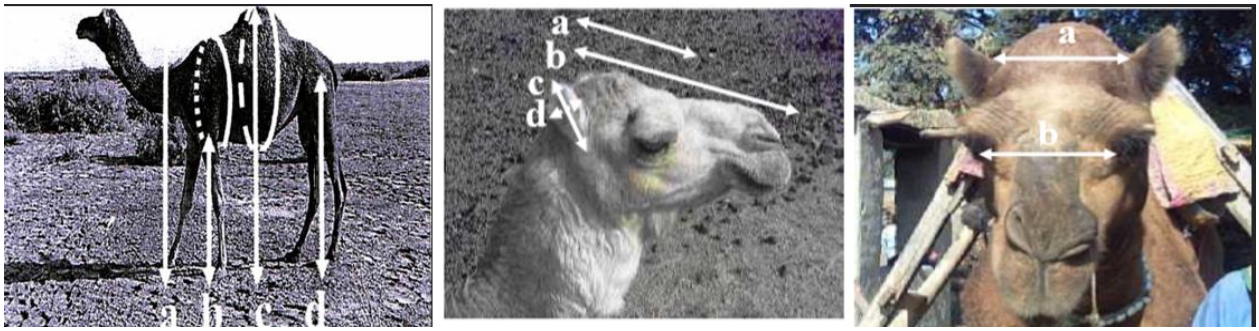

Fig. 1. *(Plate 1):* a=Shoulder height, b=Foreleg length, c=Height, d-Hind leg length, Girth=Square dots and hump girth = desh. (*Plate 2):* Morphological characteristics (a - Head length, b - Face length, c - ear length and d - ear width). (*Plate 3):* Morphological characteristics (a, b - Head and Face width, respectively).

RESULTS & DISCUSSION

The results of qualitative traits of Balochistan camel breeds are mentioned in table 1. This study revealed that 'Brahvi' camel breed has a compacts and smaller body size with short and fine legs, but chest is wider. The whole body (neck, belly and legs) is covered with dense wooly hair in cold season. 'Kharani" camel exists in three verities of colours locally called Bor (brown), sore (red) and zard (yellow). Body is compact and medium size, neck is short. This breed is resembled to Brahvi camel breed. 'Kachhi' camel breed has a compact body, short neck, small legs and small rounded, hard feet pads. "Lassi" camels have a medium sized body, muzzle is pointed, and face is longer. "Rodbari" camel breed has slim body, long chin, short neck and body is covered with dense growth of hair. "Kohi" camel "Pishin" camel breed has a large body, long eye lashes, black nail and medium legs.

Table I: Qualitative characteristics of Balochistan camel breeds

Camel breed	Habitat	Characteristics	Ecological zone
Brahvi	Chaghi District central home but extend to brahvi mountains and Bolan to Jacubabad, further found in Shadad kot, Garhi kharo and Larkana Districts of Sindh Province.	Coat colour is light to dark brown but in dim colour, Small compact body, short but strong legs, hind quarters are massive and well developed, dense long wooly hair over neck, shoulder and belly. Protrusion of tongue from mouth is command. This is a hilly and baggage camel breed.	Central Brahvi Highland (CBH). This region comprises high and arid mountains with very hot (49°C) summers and very cold (below zero) winters. The rain fall of the regions is low and erratic (100-200mm per year).
Kharani	Khran, washuk, Nushki, Khuzdar, Kalat District	Exist in three coat colours (red, yellow and brown) compared to Brahvi camel colour Kharani camel colour is shiny. Large round head, ears are small and flat. Big hump, hair is straight; protrusion of tongue from mouth is less. This is a pour ridding and desert camel breed also found in mountainous areas.	Chaghi Kharan Deserts (CKD). This region includes deserted plains, steppe and mountainous deserts. This region is very dry and hotter (40°C) in summers with rare rain fall. Gets less precipitation in winters and springs from Mediterranean winds.
Lassi	Lessbela, Awaran, Karachi and Khuzdar districts	Generally, coat colour is brown but also found in red brown. Body is comparatively large than makrani, large legs, neck, ears, eyes, foot, hump and mouth. Pointed muzzle, long head, straight forwarded neck and straight hair. Hump, udder and hind quarters are well developed. This is a dual purpose, used for ridding and walking.	Balochistan Coastal region (BCR). The climate of this region is hot (40°C) in summer and in winter temp fall to 6°C in winters. Annual rain fall is very low and precipitate about 125mm per year.
Makrani	Makran, Lessbela, Jalwan, sarwan areas.	Coat colouer is light brown to dark brown. They have slim and small body, small neck, head, legs, foots	Balochistan Coastal Region (B C R)

		compared to Laasi camels. Neck is bending like, hump is medium, and Hair is curling style. Makrani camels found in coastal region are thinner and larger in size. Hilly and bagged type camel breeds.	
Rodbari	Makran, Turbat, Punjgoor, Passni, Gowder areas.	Coat colour is dirty gray to light red. Body is slim, long chin, short neck; body is covered with dens growth of hair. Hump is well developed. Desert and bagged type camel.	Balochistan Coastal Region (B C R)
Kachhi	Originally exist between Sibi to Jacobabad, but also found in Shikarpur and Sukkar.	Coat colour is slightly darker brown. Body is compact with short neck and small legs. Medium head, lower lips droops, hairless ears and eyelids, Hind quarters are well developed. Feet pads are smaller, hard and rounded. Baggage type camel but also used for ridding. It is a riverine type of camel	Kachhi Basin Region (KBR). The climate of this region is very hot and humid in summer, harshness of summer prolongs over the months of April, may, June, July, August, September and October. In winters the weather becomes pleasant. The humidity is highest in summers.
Kohi	Dera Bugti, Kohlu, Barkhan, part of Loralai and Zhob, Musakhai districts.	Coat colour is white but also found in white, brown colour. Compact body, big head, short and thin neck, white nail, long legs, medium face and small hump is placed in centers. Foot is large, tail is medium not fatty, udder is large; eyes are white and red in colour. It is a mountainous and bagged type camel.	Suleiman Mountainous Region (SMR). The climate of the region is mild in summer because of the high altitude and rains in monsoon time.
Pishin	Pishin, Qillaabdullah and Quetta districts	Coat colour is between light brown to dark brown. Resemble to Brahvi camel. Compact body, short stature, long eye lashes; they have thick set of bones and carry heavy weights. Hilly and bagged type animal.	Northern highlands (NHL). The climate of the region is mild in summer because of the high altitude and some eastern part of the region receives rains in monsoon time. The temperature reaches to 30 C° in summer and drops below zero in winter. The region is the coldest region of the province. The annual precipitation ranges from 250-600m mm per anum

Comparison of Kharani and Brahvi camel breeds in Kharan District where they overlaps is observed that the coat colour of Kharani camels exist in three patterns locally in Balochi language called (brown), zard (yellow) and sor (red) while the coat colour of Brahvi camel breed is light to dark fawn but dim in colour compared to Kharani breed. Head of this breed is large. Hump is prominent and big; neck is large while Brahvi breed has round head, small hump and small neck. Kharani camels are less dangerous and mostly docile while Brahvi camels are more dangerous and harmful, protrusion of tongue is command. They have strong, massive hind quarters. Compare to Kharani camels Brahvi camels have wider chest.

Comparison of Lassi and Makrani camel breeds in Lassbela District, Lassi is found comparatively large body size with large legs, foots, neck, ears, eyes, lips and mouth, while hump, udder and nostril are well developed. They have straight and forwarded neck, straight hair. Makrani breed has small legs, foot, hump, ears, eyes, lips, mouth, and nostril and shoulders while neck is bend like and hair is curling style. Makrani camel colour is brown to dark brown and colour of Lassi camel is brown with reddish tinge.

Regarding to draught camels are divided two categories, “Baggage” and “Riding” types. Baggage type further divided into “Hilly” and “Plains”, hilly type camels in context to habitats divide into “Lowland” and “Mountain”. Lowland has two components “Riverine” and “Desert”, Mountain’s type

camels are divided into "Ridding" and "Pak" type camels (12). The native camel breeds of Balochistan are generally fall in three components and they are hilly and baggage type (Brahvi, Makrani, Pishin, Rodbari). Kharani camel breed is purely ridding breed. Kachhi and Lassi breeds are dual purpose breeds camel, so they can be used for weight carrying and as well as for ridding. Baggage type camels in Balochistan are used for ridding but ridding of these camels is not comfortable. Hilly are baggage type camel breeds have comparatively small, compact, massive body, short neck and legs, wide chest, well developed hindquarters.

The overall means and std. error for growth traits of Balochistan camel breeds are mentioned in table 2. In both production (sedentary and transhumant) systems, sex had a significant effect on Growth characteristics. The findings of present study are in horizontal line with the findings of Waheed and Tariq (13). Different reports are present in camel world. In generally the average birth weight of camel is mentioned about 37kg, but it may differ extensively among regions, breeds and within the same breed and it may range between 27kg to 39kg (14). In India the birth weights of camels range from 26.3 to 51.2 kg, with mean of 37.3 kg (15). Sabahat (16) reported that the average birth weight, weaning weight and adult weight of male and female lassi breed camels was 41kg and 39 kg, 68 kg and 65 kg, 570 kg and 550 kg respectively.

Table II: Least means square of growth characteristics of Balochistan camel breeds

Camel breeds	No of camels	Birth weight (kg)	Weaning weight (kg)	Adult weight(kg)	Age of ridding (days)	No of camels	Age of loading (days)
Brahvi	30	47.33±0.50	118.57±0.91	648.83±3.33	1296.4±27.74	13	1664.5±4.34
Kharani	29	46.96±0.39	118.83±1.06	698.72±4.69	1192.9±6.78	13	2487.6±26.07
Lassi	30	41.36±o.64	111.43±0.92	598.07±5.71	1118.6±4.90	13	1669.6±5.86
Makrani	30	46.96±0.75	115.87±0.88	684.37±4.44	1280.9±4.32	13	1664.5±4.34
Roadbary	30	48.58±0.43	118.37±0.83	696.37±3.67	1429.8±1.06	13	1672.0±2.71
Kachhi	30	45.63±0.39	115.47±0.81	656.30±4.08	1195.6±2.04	13	1601.5±17.66
Kohi	30	38.46±0.52	110.50±1.42	657.00±3.77	1389.3±7.25	13	5675.8±2.93
Pishin	30	48.40±0.41	117.97±0.41	712.00±3.46	1273.9±2.04	13	1719.9±43.82
Total	239	45.44±0.28	115.86±0.39	668.83±2.66	1285.1±7.10	104	1630.9±48.2

The overall means and std. error for sometometric measurements of Balochistan camel breeds present in **TABLE 3**. The finding of this study for sometometric measurements are in agree with the findings of G.B.isani and M.N.Baloch (**17)** for same breeds of camels . In sometometric measurement's males had a significant difference for girth, height and length than female's camels. Biometry is most important section of physical traits (**18**). In Pakistani camels, Marecha, Dhatti, Larri, Kohi, Sakrai and Campbelpuri breeds sometometric measurements calculated for Heart girth 211.9±15.8, 211.1±12.9, 210.3±16.6, 200.4±8.3, 199.6±12.5, Height, 216.8±15.9, 228.4±10.5, 216.6±12.7, 189.1±7.1, 216.4±22.9, 201.3±22.6 Length 165.5±9.9, 176.8±9.8, 174.5±13.7, 147.2±8.5, 194.9±13.9, 163.4±24.6, Fore leg 120.3±6.9, 134.2±3.2, 133.8±11.6, 123.8±3.1, 124.1±2.8, 117.1±4.9 Hind leg 150.9±8.7, 159.9±6.1, 158.9±5.6, 141.2±5.0, 158.8±6.0, and 152.9±7.2 respectively (19).

Table III: Least means square for somatometric measurements of Balochistan camel breeds

Camel breeds	No of camels	Heart girth (cm)	Height (cm)	Length (cm)	Foreleg length (cm)	Hint leg length (cm)
Brahvi	30	210.80±1.93	203.90±2.23	204.87±2.23	148.77±2.41	158.07±2.43
Kharani	29	224.79±1.00	218.86±1.24	184.66±5.41	161.62±2.20	169.59±2.46
Lassi	30	224.50±2.01	215.30±1.65	173.57±0.97	153.03±0.90	162.27±0.93
Makrani	30	212.90±0.93	206.10±0.96	205.40±0.91	149.87±o.57	157.13±0.73
Roadbary	30	218.18±6.77	212.83±0.76	178.87±0.75	162.62±0.60	162.62±0.60
Kachhi	30	228.43±1.63	237.00±1.38	190.70±2.06	160.83±1.65	171.23±1.52
Kohi	30	204.13±2.85	200.97±2.94	144.93±3.64	98.43±1.54	108.67±1.50
Pishin	30	232.38±0.86	223.82±1.19	158.28±1.29	155.90±1.11	165.67±105
Total	239	219.49±1.17	214.83±0.92	180.34±1.57	147.60±1.34	156.85±1.33

Overall means and std. error for productive characteristics (Milk yield, Lactation length, Hair production and meat production) are displayed in table 4. The results of this study for productive traits are closely confirmed the finding of G.B. Isani and Baloch (17). Connection to milk yield per lactation Pakistan stands first among camel rearing countries (India 2482; Somalia 1825, Tunisia and Algeria 1460; Ethopia 1825) with an average milk yield 2920 liters (20). In a study regarding to hair production of Kharai, Dhatti, Larri and Sukari camel breeds of Sindh province of Pakistan are 1.63, 1.62, 1.47and 1.36 respectively (21). According to (22) average slaughter weight of Pakistani camels ranged from 395/660 kg and dressing percentage (%) ranged from 45 to 55% (exceptionally 60%), while hair production ranged from 1-3kg. The result of present study regarding to meat and hair production are in line with these findings.

Table IV: Least means square of productive performance of Balochistan camel breeds.

Camel breeds	No of camels	Milk yield per lactation (lit)	Lactation length (days)	No of camels	Hair production (kg)	Meat production dressing % (kg)
Brahvi	17	1658.4±7.86	579.18±4.06	30	2.38±0.02	49.90±0.79
Kharani	16	1680.6±5.93	549.8±5.02	29	2.32±0.03	54.58±0.07
Lassi	17	1335.2±4.13	318.00±4.65	30	2.26±0.05	51.56±0.93
Makrani	17	1929.0±9.20	526.76±2.79	30	2.62±0.42	50.96±0.82
Rodbari	17	1703.0±2.65	461.94±1.11	30	2.47±0.08	52..90±0.90
Kachhi	17	2049.3±4.21	542.06±4.05	30	2.12±0.03	51.50±0.83
Kohi	17	1837.8±3.86	377.06±7.71	30	2.83±0.67	48.96±0.74
Pishin	17	1714.9±8.20	368.00±4.28	30	1.58±0.04	52.33±0.88
Total	135	1739.0±17.38	464.73±8.16	135	2.32±0.10	51.70±0.31

The overall reproductive traits in female camel breeds of Balochistan are present in table 5. The results of present study are nearly parallel with the findings of Isani and Baloch (17) and Shah (19). The gestation period ranged between 377 to 390 days. The result of present study regarding to average gestation period (389 days) is little bit higher than the average gestation period of 380 days calculated by the results of many other researchers (23,24, 25,26,27).

Table V: Least means square of reproductive traits of Balochistan camel breeds.

Camel Breeds	No of Camels	Age of Puberty (Days)	Age At 1st Breeding (Days)	Gestation Period (Days)	Dry Periods (Days)	No of Calves During Life	Calving Intervals (Days)	Reproduction Span (Yrs)
Brahvi	17	1282.6±6.99	1575.7±12.79	379.88±0.94	369.12±3.11	17.35±0.28	719.82±4.72	19.64±0.67
Kharani	16	1115.9±6.86	1509.1±14.72	382.81±2.83	351.31±3.22	9.37±0.61	768.75±6.86	20.49±0.49
Lassi	17	1232.4±13.12	1513.8±7.16	399.35±5.59	338.18±3.96	18.41±0.34	778.24±4.18	21.52±0.83
Makrani	17	1203.6±15.18	1453.9±7.23	405.53±3.84	354.59±4.29	17.64±0.27	776.53±3.85	19.58±0.57
Rodbari	17	1024.6±13.51	1206.9±13.46	377.00±2.23	282.77±2.28	17.94±0.31	787.65±1.65	20.05±0.60
Kachhi	17	1278.4±20.31	1529.6±20.33	394.24±6.34	313.65±4.98	15.52±0.35	727.Oo±4.98	17.17±0.43
Kohi	17	1297.5±22.50	1522.8±18.51	389.41±3.65	384.88±5.73	14.11±0.54	726.82±11.69	16.23±0.65
Pishin	17	1231.0±16.36	1325.8±16.81	388.12±3.26	326.76±4.74	18.35±0.36	795.18±3.33	20.64±0.57

CONCLUSION

Camel is most common and abundant specie of Balochistan province of Pakistan. The popularity of camel in Balochistan can be image by the fact that camels represent the provincial monogram of Balochistan. The study concluded that camels proved their sustainability in arid, semiarid, deserts and periphery arias of Balochistan. Generally, livestock, especially Camel is playing as back bone role regarding to food security and live hood of nomadic and pastoral people. Beside these huge advantages the provincial government and livestock department completely neglected this species which is bestowed with unearth potential. In this study camels of Balochistan were found badly suffered with poor health and nutrition conditions. Camels were found with high ratio of ecto and endoparasites and there is no concept for schedule vaccination

programs due to completely uneducated camel owners. It is great need of time that provincial government and especially livestock department arrange mobile teams for health care programs of camels. Present study disclosed that the birth weight, adult weight and milk yield of Balochistan camels are higher than the many countries (Somalia, Sudan, Ethiopia, Tunisia, Iran and Suede Arabia). However reproductive performance is slightly durable which can be improved with the implementation of latest breeding methods. Intensive commercials farming, developing of marketing system and installing of milk processing units are the ways to attain the unearth potentials of camels.

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Authors Contribution

All authors contributed to make this manuscript possible. Abdul Fatih conducted research. Muhammad Masood Tariq and Masroor Ahmad Bajwa supervised the research. Abdul Waheed, Muhammad Ashraf Tareen, Qasim Raza and Ecevit Eyduran helped in analysis. Asim Faraz wrote the paper, Majed Rafeeq, Illahi Bakhsh Marghazani and Jameel Ahmed helped in write-up, Iqbal Saeed and Mudassar Jehan reviewed the article.

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