



Camel Production Profile in Desert Ecosystem of Thal, Punjab

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Abstract: A study was planned to evaluate the production profile of Marecha camel maintained in desert ecosystem of Thal area, Tehsil Mankera of District Bhakkar, the Punjab. Different husbandry practices, milk production, calf rearing and the constraints faced by the Thal pastoralists affecting the camel production and management were studied through a pre tested questionnaire. A total of 100 farmers were interviewed by using a single-visit-multiple-subject diagnostic survey. Most of the camel herders were keeping Marecha camel. According to the farmer's responses, the living status of camel herders has improved and the major source of income is the sale of milk, meat, animals and crop cultivation. Many of the herders kept their camels in semi-open housing system and took them for grazing from morning till evening along with stall-feeding. The mean daily milk yield was found to be 5.62 ± 0.27 kg. Birth weight of male and female calves was found to be 37.96 ± 0.55 and 32.39 ± 0.22 kg, respectively. Calf mortality, traditional way of husbandry practices, poor extension services, lack of attractive market and value chain services were the major constraints affecting camel production. Survey indicated that camel herders are more inclined towards ethno-veterinary practices than approaching the nearby veterinarians. Based on survey and constraints collected, some remedial measures have also been suggested.

Keywords: Camel production, Marecha, desert ecosystem, Punjab

1. INTRODUCTION

Livestock sector is very important part of agriculture in Pakistan and contributes 11.1% in Gross Domestic Product (Pakistan Economic Survey, 2017-18). Pakistan is bestowed with high yielding genetically potent animals and ranks 8th in the world regarding the camel population with 1 million camels (FAOSTAT, 2016). Generally camels are of two types, i-e one humped (*Camelus dromedarius*) or Arabian camel and two humped (*Camelus bactrianus*) or Bactrian camels. One humped camels are 95% of total camel population. More than 40% of Pakistan's camel population is present in Balochistan, 30% in Sindh, 22% in Punjab and 7% in Khyber Pakhtunkhwa province (ACO, 2006).

Camels in Pakistan are very well adapted to their native environment and can sustain life in hot and harsh deserts and dry land ecosystems. The dromedary camel is a best source of milk and meat especially for those areas where production performance of other animals is adversely affected by the harsh environmental conditions (Faraz *et al.*, 2013). This is due to its unique physiological characteristics that enable to tolerate higher temperatures, solar radiations, water scarcity, poor vegetation and rough topography. Camel has less competition with any domestic specie regarding feed and performance. Due to these attributes camel is considered as the animal with unfathomed potential to meet the future dietary and medical needs of human

beings (Faye and Esenov, 2005). However, in spite of all these attributes, the camel has for long remained a neglected animal.

Camel is an important multi-purpose animal for the inhabitants of desert ecosystem, mountainous and irrigated plains of Pakistan (Ahmad *et al.*, 2010; Samara *et al.*, 2012; Pasha *et al.*, 2013). Camels are mainly kept by the migratory pastoralists in subsistence production system in arid and semi-arid areas in Pakistan (Iqbal, *et al.*, 2012). However, its contribution to the agricultural economy in Pakistan is yet to be assessed. In addition to pack and draft animal, it is a good source of milk, meat and hides for the herders of extreme desert areas and dry lands. Camel milk is sold in small quantities and also shared with neighbors. The major importance of camel milk is its availability in dry season and conditions of droughts when milk from other livestock species is inadequate (Pasha *et al.*, 2013).

There is handsome share of camel's milk in the basic diet of pastoral community that contributes up to 30% in annual caloric diet. Daily milk yield of camel is 3-10 kg with a lactation period of 12-18 months. Reported average milk yield for Marecha camel is 4179 liters annually. Average daily milk yield is 8-10 liters (lactation length varies between 270-540 days) but with intensive management conditions it increases up to 15-20 liters daily (Sial, 1950; Ahmad *et al.*, 2010). Camel

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meat is largely consumed by the people of rural and remote areas of Pakistan, as most of the people of cities have not developed their taste for it yet. However, the trend is going to be changed as the people are getting awareness about the medicinal and therapeutic properties of camel milk and meat (Khan, 2012; Sazmand, *et al.*, 2012).

Some researchers like Jasra, *et al.* (1999), Jasra and Isani (2000, 2003), Khan *et al.* (2003) and Pasha *et al.* (2013) discussed and documented the production and management of camels in Pakistan. However, a deep insight into the camel production and management in Thal desert was lacking so the current study was performed to check the camel husbandry, production profile and prevailing constraints in Thal desert at Mankera region, Bhakkar.

2. MATERIALS AND METHODS

Description of the Study Area

Tehsil Mankera of District Bhakkar is located between 31° 10' and 32° 22' Latitude and 70° 47' and 72° Longitude, most of the area comprises on the deserted plains and dry land named as Thal desert (Anonymous, 2011). This area comes under the agro ecological zone-III with less precipitation. Sandy deserts having narrow strips of sand ridges and dunes while the climate is arid to semi-arid with mean summer temperature goes up to 45.6°C and in winter it falls from 5.5 to 1.3°C. Mean annual rainfall ranges from 150-350 mm, increasing from South to North (Rahim *et al.*, 2011).

Areas and Tribes/Castes Visited

Different areas like Katemar, Khio, Mahni, Chamb, Jey-theend, Loodeywala, Darboola, Shergarh, Bhidwal, Digana, Kalayarwala, Basti Islamabad and Hyderabad Thal were visited to perform survey for collection of the data. Different tribes/castes like Raja, Saghu, Bhidwal, Larrah, Magassi, Mammataloch, Machi, Tarkhan, Bhatti, Hashmi Qureshi, Karlo and Sahoo were present there.

Sampling Method and Data Collection

A questionnaire survey was conducted in these areas of Mankera region of District Bhakkar, to collect data on the caste/tribes, camel holding capacities, age of dam, physiological status, milk production, feeding, housing conditions, birth weights, management practices and different constraints affecting camel production using a single-visit-multiple-subject diagnostic survey (ILCA, 1990). A total of 100

households, who owned camels (adults and calves) were selected using purposive sampling technique. The production system variables included general management, housing, feeding, disease control and production constraints as perceived by the owner and solutions sought. All the information was obtained from farmers by means of a semi-structured questionnaire.

Statistical Analysis

Microsoft Excel was used for data compilation. Ranking of the major contributions of dromedary camel was performed by using method described by International Livestock Center for Africa (ILCA, 1990). Descriptive statistics (frequencies, percentages, averages) of different parameters of traditional camel husbandry practices were derived using SPSS (SPSS, 2008) software (Steel *et al.*, 1997).

3. RESULTS

Camel Holdings

Different herders kept different number of camels as 4% had 1 camel only, 20% had 2, 30% had 3 and 4 and 16% had 5 numbers of camels, while 4% herders had 1 male camel, 60% had 2 male and 26% had 3 male, 6% herders had 1 female, 16% had 2 female, 40% had 3 and 30% had 4 females (**Table I**).

Age of Dams (years)

Two dams had 6 years age, four had 8 and 9, six had 10, eight had 11, twenty had 12, twenty six had 13, twenty had 14 and six had 15 years of age while 4 people have calves only but no dam (**Fig. 1a**).

Physiological Condition of She-Camels

About 10.4% she-camels were dry, 12.5% were lactating, 39.6% were pregnant and lactating while 37.5% were dry and pregnant (**Fig. 1b**).

Stage of Lactating She-Camels

About 50% she-camels were found to be lactating. Among those 20 she-camels were in 0-6 months of lactation, 10 in 6-9 and 14 in 9-12 while 6 were in 12-18 months of lactation (**Fig. 1c**).

Parity Status of She-Camels

Four she-camels were in 1st parity, six in 2nd, twenty four in 3rd and forty eight in 4th while fourteen were in 5th parity (**Fig. 1d**).

Milk Production of She-Camels

Mean milk yield and range of Marecha she-camels were found to be 5.62±0.27 and 3-8 kg (**Table 2**).

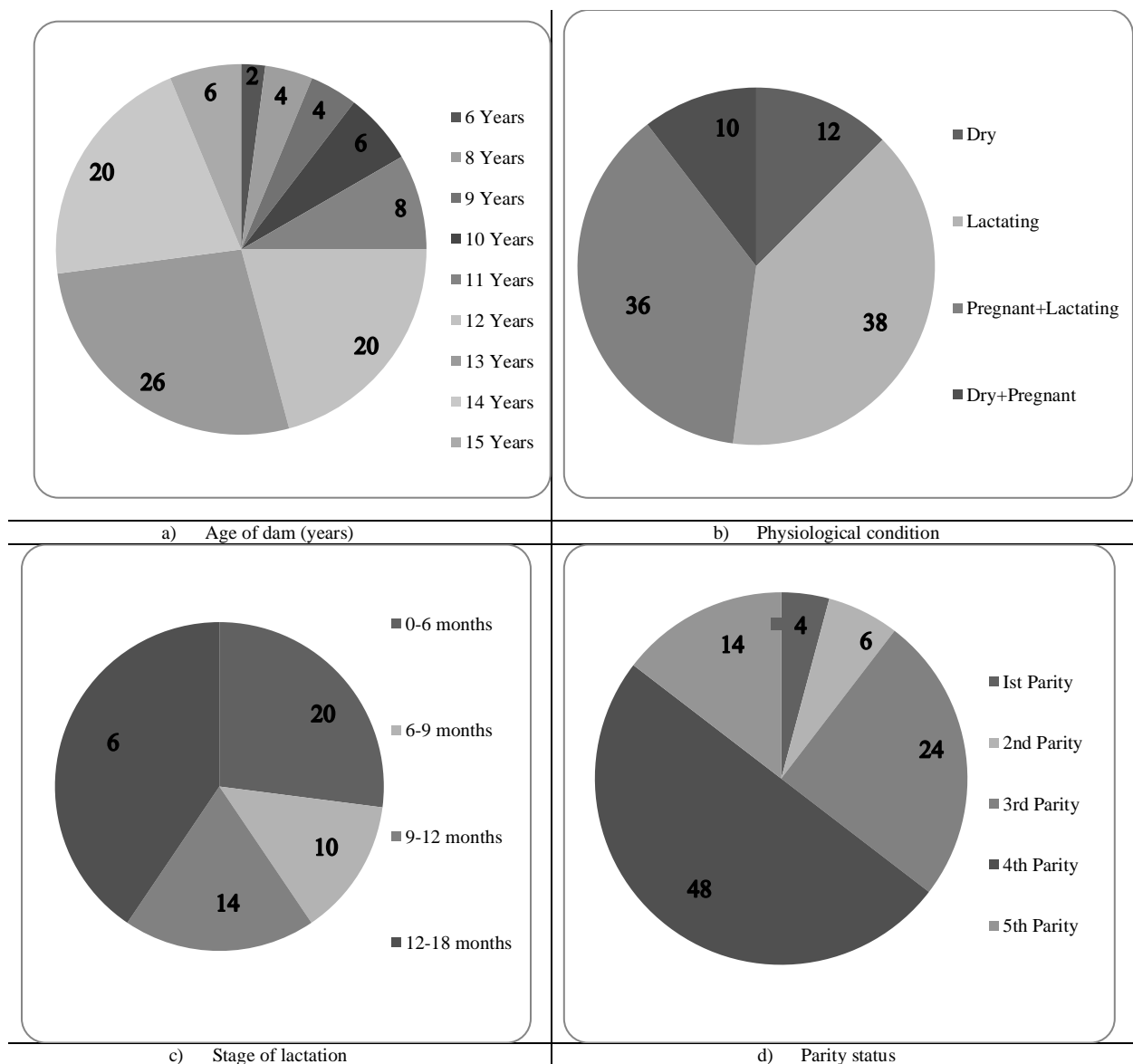


Fig. 1: Animal profile in Mankera Tehsil of District Bhakkar, the Punjab

Housing and Feeding of Camels

Housing and feeding practices of camels in the study area were explored. Camels reared in open housing system were 60% while 40% were in semi-open housing system (Table 3). It was observed by survey that about 90% of camel houses were clean enough and only 10% were dirty. The family labors usually do all these cleaning and feeding chores. About 52% camels were stall-fed with lucerne (*Medicago sativa*), missa (*Cicerarientinum+ Vigna radiate*) straws and household kitchen wastes; 32% camels were stall-fed with lucerne (*Medicago sativa*), cotton seed cake (*Gossypiumhirsutum*), missa (*Cicerarientinum+ Vigna radiate*) straws and households refusal; 10% camels were stall-fed with jodar (*Avena sativa*), missa (*Cicerarientinum+ Vigna radiate*) straws and household

wastes while 6% camels were stall-fed with jodar (*Avena sativa*), lucerne (*Medicago sativa*), missa (*Cicerarientinum+ Vigna radiate*) straws and households surplus. Allowed grazing time was 6-8 hours for 10% while 8-10 hours for 90% of camels (Table 3).

Management Practices

All herders do watering for 3 or 4 times per day, give stomach powder or salts routinely to camels and some provide exercise for dancing trainings. Breeding season is from November to March and herders mainly use village bull for breeding while others in close vicinity visit to Camel Breeding and Research Station (CBRS) Rakh Mahni for breeding, which is of their preference choice to get service from the farm bulls.

Pastoralists allow mating 2-3 times and give extra flushing allowance to 100% bulls. Poll gland secretion (in rut season) and *Dulla* protrusion was observed in 100% bulls.

Calf Holdings

Different herders kept different number of calves, 6% herders had 1 calf only, 52% had 2 and 42% had 3 calves, 4% herders had 1 male calf and 68% had 2 male calves, 14% herder had 1 female calf and 50% had 2 female calves. The age distribution of the young animals was to the tune of as: 20% calves were sucklers, 24% were weaned, 48% were male young stock and 16% were female young stock.

Birth Weight of Calves

Mean birth weights of calves were found to be 37.96 ± 0.55 , 32.39 ± 0.22 kg; while range of weights were 35-50 and 30-35 kg, in male and female calves, respectively (Table 4).

Husbandry Practices of Calves

Fourteen percent calves were found to be suckling colostrum while 86% calves were not suckling colostrum. Almost 100% calves were found to be suckling two teats, while 90% calves were allowed to suckle by restricted time and 10% calves were allowed to suckle anytime. Age of weaning was 7-12 months in 32% calves, while 12-16 months in 68% calves. Deworming was performed by 12% herders while mortality in calves was 24% (Table 4).

Table 1: Camel holdings by herders in Mankera Tehsil of District Bhakkar, the Punjab
(a) Adult Camel holdings

| Herder (%) | No of camels | Herder (%) | Males | Herder (%) | Females |
|------------|--------------|------------|-------|------------|---------|
| 4 | 01 | 4 | 01 | 6 | 01 |
| 20 | 02 | 60 | 02 | 16 | 02 |
| 30 | 03 | 26 | 03 | 40 | 03 |
| 30 | 04 | | | 30 | 04 |
| 16 | 05 | | | | |

(b) Calf holdings

| Herder (%) | No of calves | Herder (%) | Males | Herder (%) | Females |
|------------|--------------|------------|-------|------------|---------|
| 6 | 01 | 4 | 01 | 14 | 01 |
| 52 | 02 | 68 | 02 | 50 | 02 |
| 42 | 03 | | | | |

Table 2: Milk Production and Surf Field Mastitis Test (SFMT) of she-camels in Mankera Tehsil of District Bhakkar, the Punjab

| Parameters | Average | Range |
|--------------------|-----------------|-------|
| Milk Yield (M) | 3.16 ± 0.15 | 2-4 |
| Milk Yield (E) | 2.46 ± 0.14 | 1-4 |
| Milk Yield (Total) | 5.62 ± 0.27 | 3-8 |
| SFMT+ | 5.4% | - |
| SFMT- | 94.6% | - |

Table 3: Housing and feeding of camels in Mankera Tehsil of District Bhakkar, the Punjab

| Parameters | Percent values | |
|------------|---|---|
| Housing | 60% Open 90% Clean | 40% Semi-open 10% Dirty |
| Feeding | 100% Stall-fed | 100% Grazing |
| | 52% Lucerne+Missa+Household refusals 32% Lucerne+CSC+Missa+Household refusals 10% Jodar+Missa+Household refusals 6% Jodar+Lucerne+Missa+Household refusals | 10% 6-8 hours (grazing time) 90% 8-10 hours (grazing time) |

Table 4: Birth weight, husbandry practices and mortality of calves in Mankera Tehsil of District Bhakkar, the Punjab

| Parameters | Mean/Percent | Range |
|--------------------------------|--------------------|---------------------|
| Birth weight (♂) kg | 37.96±0.55 | 35-50 |
| Birth weight (♀) kg | 32.39±0.22 | 30-35 |
| Colostrum feeding | 14% | ---- |
| No. of teats allowed to suckle | 2 in 100% calves | ---- |
| Time of suckling allowed | 90% (restricted) | 10% (anytime) |
| Age of weaning (months) | 32% in 7-12 months | 68% in 12-16 months |
| Deworming | 12% | ---- |
| Mortality | 24% | ---- |

4. DISCUSSIONS

Milk Production of She-Camels

Current results are in line with the findings of Hussien (1989), Gedlu (1996), Kebebew and Baars (1998) and Tezera (1998) who reported range from 4.5-7.5 liter milk per day in Eastern African camels while in contrast with the findings of Zeleke and Bekele (2001) who reported range as 1.5-3.1 liter/d in Ethiopian camels. Khan and Iqbal (2001) reviewed various breeds of camel and reported a wide range as 3.5-40 kg daily milk yield of camels in different production systems. Melaku and Fesha (2001) and Bekele *et al.* (2002) reported 2.5 liter and 4.14±0.04 kg daily milk yield in Ethiopian camel while Farah and Fischer (2004), Ali *et al.* (2009) and Ahmad *et al.* (2010) reported range for daily milk yield of Pakistani camel as 3-10 kg that supports the findings of present research. Recently, Raziq *et al.* (2010) while studying Kohi camel in mountainous areas of Balochistan reported mean daily milk yield of 10.2±0.43 kg. Eisa and Mustafa (2011) reported range for milk in Sudanese camel as 5-10 kg/d. Kamoun and Jemmali (2012) studied milk yield of Tunisian camel and reported average daily milk production was to be 6.72±2.46 liter. Nagy *et al.* (2013) studied milk production of dromedary camels under intensive management in United Arab Emirates and reported average daily milk yield as 6±0.12 kg. In present study regarding health status, 5.4% lactating she-camels were found to be *mastitic*. Mastitis is detected by the surf field mastitis test which is used locally in Pakistan instead of California mastitis test due to the higher cost of Alkyl-Aryl Sulfoxide. Procedure is simple and ingredient used is easily available in surf (detergent) locally used in market.

Birth Weight of Calves

Present results are in line with the findings of Wilson (1978) who reported the average birth weight of dromedary camel as 35kg and Bissa, *et al.* (2000) who also reported 39 kg birth weight in Indian dromedary calves, however, it varies between breeds, regions and even in animals within the breed. The average birth weight of Bikaneri Indian calves were reported to be 42.15±0.77 and 38.82±0.64kg in males and females, respectively (Khanna, *et al.*, 2004). Present findings are not in line with the findings of Field (1979), Hammadi *et al.* (2001), Ouda (1995) and Simpkin (1983)

whosereported birth weights were to be 26-28 kg in Somali and Tunisian camel calves. Moreover there is a minimum influence of sex on birth weight in dromedaries as reported by Ouda, (1995). However, the sexual effect was clearly pronounced in our study.

Constraints

Thal is the second largest desert of Punjab and rich in livestock resources. Mainly indigenous breeds of sheep, goats and camels are raised here. Marecha is most favorite and beautiful camel breed rose in this area. People raise Marecha breed with aesthetic preference for dancing and riding purpose. Utility of that animal as meat and dairy purpose is still limiting due to many anthropological reasons. Major issues observed regarding intensifying the camel husbandry practices in the study area is presented in the ensuing lines:

1. Camel husbandry has a strong attachment with the herders in the area and is interwoven with their system and dry land farming
2. Camel products are in novelty and have yet to achieve preference over cow or buffalo milk and meat products
3. Lack of information and guidelines regarding value addition of camel milk and meat products
4. No attractive market and value chain services regarding camel products
5. People mainly raise camel for aesthetic preference for riding and dancing purpose, so the utility of their meat and dairy products as well as wool is minimum
6. Lack of information and guidelines regarding formulation of camel ration and no nutritional standards for growth and production
7. Lack of consultancy regarding commercializing the camel husbandry
8. Even we have not standardized our nutritional profile for rearing camel as meat and dairy animal
9. Calf mortality is a major issue, mainly calves are born in harsh and hostile climatic conditions, and their growing season is May and June which is of forage scarcity period, so the mother camels even do not met their own requirements and allowance. Thus, the lactation is lesser or minimum to achieve the better growth rate for calves in that season

10. Poor extension and consultancy services for farmer empowerment and entrepreneurship
11. Traditional way of husbandry practices
12. Main reliance on ethno-veterinary practices
13. Lack of gender training in the area

5. CONCLUSION

Based on survey and constraints collected some remedial measures have been suggested.

1. Extension services about management, feeding, breeding, clean water therapy and treatment, should be provided to the camel herders
2. Rangeland development should be focused and watering point's development is need of the time
3. Ethno-veterinary knowledge should be collected and preserved in the form of indigenous knowledge
4. Government along with public sector should provide health cover; Mobile veterinary dispensaries/clinics should be there
5. Village cooperative societies should be developed and local members should be incorporated
6. Farmer field days/camel day/competitions should be organized to take care the camel herders concerns, moreover treatment at spot should be provided
7. Disease surveillance and monitoring should be in vogue
8. Herders should be provided regular markets with ample facilities
9. Measures should be done for range improvement like seeding of grasses, trees, herbs and shrubs at proper time along with rotational grazing

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