



## PRODUCTIVE PERFORMANCE OF FEMALE KAMORI GOAT MAINTAINED UNDER SEMI-INTENSIVE MANAGEMENT CONDITIONS

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### ABSTRACT

The study was conducted to investigate the female productive performance of Kamori goat managed under semi-intensive management condition at Kamori Goat Farm, Khudabad Sindh, Pakistan. The data on 136 goats were collected from the records available at the farm and utilized for this study. The results revealed that the mean ( $\pm$ SEM) kidding interval was recorded as  $252.47 \pm 0.289$  days, gestation length  $150.015 \pm 0.76$  days and length of dry period  $68.254 \pm 0.289$  day. The average daily milk yield and lactation length was observed as  $2.7286 \pm 0.0177$  liters and  $112.83 \pm 0.294$  days, respectively. The significant difference was found for kidding interval while for gestation period no significant difference was found. It can be concluded that productive performance of Kamori goat is suitable and can be utilized for sustainable goat farming in the home tract area of this breed for milk and meat production.

**Keywords:** goat, semi-intensive, management, production, performance

### INTRODUCTION

The tropical and subtropical climate provides a unique habitat for goat raising. Conducive climate, dense vegetation and rural socio-economic structure are facilitating concentration of goat population in the region. Shortage of land, acute unemployment and increased ratio of poverty compel underprivileged group of people towards production of low cost input for goat farming. More than 97% goats are being kept by the farmers living in the rural areas. The goat keeping becomes an alternate source of income to landless peasants of the rural community. Next to dairy cattle and buffaloes, goat ranks second position and primarily reared for meat and milk purpose (Dossa *et al.*, 2008). Its meat is tender, leaner and has human preference over beef and is considered as prized meat in Pakistan (Waheed and Alvi, 1988). Additionally goats are kept for savings, investment and social functions and for sacrifice at Eid-UI-Adha and considered as a cash crop animal of rural families (Eik *et al.*, 2008). Goat is a

small sized, maturing at an early age (6-10 months), short gestation period (Eik *et al.*, 2008), less reproductive problems, having low capital investment required as compared to cow and buffalo. It can easily be managed by housewives and/or middle age children (Dossa, 2008). Kamori goat is a dairy and meat breed found in Hyderabad, Bhit Shah, Saeedabad, Matiyari, Tando Adam, Tando Allahyar and Dadu districts of Sindh Province (Issani and Baloch, 1996). The adult live body weight is about 70.0 kg in male and 45-60 kg in female. The female goat produces 2-3 liters of milk per day, hence remembered as “Poor man’s cow” (Khan *et al.*, 2008).

In Pakistan there are 25-36 recognized goat breeds, but still there is conflict in number of goat breeds (Khan *et al.*, 2008). Presently Pakistan has 66.6 million of goats and is the third largest goat producing country after China and India (GoP, 2015). The province of Sindh is rich in goat wealth having goat population around 12.573 million heads, out of those 3.906 million of goat are from Kamori breed only (GoP, 2006). The poor managemental practices reduce the productivity as well as reproductive performance, which resulted economic losses to the farmers. The grazing alone may not be sufficient for optimum productive performance of goat. Furthermore, the genetic potentiality and productivity of these goats are going to be decreasing day by day due to lack of improved management practices (Khan *et al.*, 2008). If a little importance has been paid, to change in rearing practices could boost up the productivity of the animals. In spite of its importance and useful role the goat has not been given due consideration and remained neglected animal in the past, hence average production per animal remained very low. In present scenario people prefer goats’ meat over the poultry or beef. Hence, goat production has become alternate livestock farming. Very little information is available on productive performance of Kamori goat. Therefore, the present study was planned to investigate the productive performance under semi-intensive management condition to exploit the potentialities of Kamori goat breed for the welfare of poor rural community.

## **MATERIALS AND METHODS**

### **Study area**

The data on 136 goats were collected on productive performance of Kamori goat breed maintained under semi intensive management condition at Kamori goat farm Khudabad, Dadu. The principal objectives of the goat farm are to improve breed, health of animal, reproductive and productive traits and to supply genetically superior bucks to private goat farmers. The performance records of goats for last five years were analyzed and used for this study. Only those records were selected and included for performance analysis which deemed to be completed in all respects.

### **Housing and feeding**

The goat flock was raised in the sheds, which were scientifically designed to provide an adequate space, ventilation and sanitation. The goat flock was allowed for grazing in daytime and stall-feeding were also practiced on return of animals to sheds. The seasonal green fodders available according to the season were offered. The concentrates ration (barley, cotton seed cake and wheat bran)

at the rate of 250 gm were given daily/animal and common salt blocks were placed in mangers for licking. Water was provided ad-libitum in plastic tubs in the shed and from nearby irrigation channel during the grazing period. All goats were identified with ear tag numbers. The vaccination of goat flock at the farm was performed regularly as per schedule against various contagious diseases. The deworming was also practiced at regular interval.

### **Breeding**

The natural breeding was practiced at the farm. The bucks were allowed with the goat flock for breeding. The flock was maintained in a year-round free mating system. As only Kamori goat was maintained at the farm and the herd was bred strictly from the bucks of same breed.

### **Recording the data**

The records maintained at farm was utilized for this study, regarding kidding interval, gestation length, length of dry period, milk yield and lactation length. The data were recorded of each goat doe on separate proforma specially designed for this purpose. The quantity of milk was estimated by milking the does once in a week starting from 7th day of kidding. Milking was done in morning and evening and average milk yield was calculated and recorded for each doe.

### **Statistical analysis**

Data were analyzed using Students Edition of Statistics (SXW-Version 8.1), to calculate the means and standard errors using simple descriptive statistical analysis methods.

## **RESULTS AND DISCUSSION**

### **Kidding interval**

Kidding interval (KI) is the period expressed in number of days between two successful kidding. It is an important reproductive trait in animal production due to its effect on animal population turnover rate, total lifetime productivity and has significant influence on production performances of the female animals. The lactation length and dry period are the components of kidding interval. In the present study the mean ( $\pm$ SEM) kidding interval was found as 252.43 $\pm$ 2.983 days (Table 1). These results are in close agreement with the results reported by Tesfaye (2009) and Baloch (2014). They reported the KI as 252 and 250 days, receptively for goats. The results of current study for kidding interval fall in the similar range (162-354 days) as reported by Songs *et al.* (2006) in Korean Native goat breed. However, on the other hand the results recorded for kidding interval in present study are also in close agreements with the results reported by Ali (2006). He reported the KI which was ranged in between 236-265 days in Beetal goats. In contrast to that a short KI (204 days) was reported by Faruque *et al.* (2010) in goats.

The results reported for KI, seems to be much longer (314 days) than the findings recorded in present study. The long KI interval was because of the goats were raised under feed shortage areas and on grazing lands (Ahuya *et al.*, 2009). Kidding interval was found to be increased as parity increases. Furthermore Webb and Mamabolo (2005) reported that the parities and birth

types had no significant effect on kidding interval. Bushara *et al.* (2012) conducted a field survey and reported as 337.6 days kidding interval in Taggar goats. These results were shorter than the findings recorded in current study. The mean kidding interval of Abergelle goats were recorded as  $289 \pm 17.03$  days (Deribe and Taye, 2014). The reported results were higher as compared to the results recorded in present study in Kamori goat. Malnutrition is another factor which lead to longer kidding interval (Faruque *et al.*, 2010), which extends KI as long as 384 days in dairy goat breeds (Eik *et al.*, 2008). Kidding interval decreases by 4.4 days for every 1 kg body weight, increase in postpartum live weight of doe. The feeding balance ration after kidding reduces KI interval up to 7 days (Alphonsus *et al.*, 2010). If the doe does not cycling and not going to be conceived leads to increase in length of KI and had negative impacts on overall farm profit (Singh *et al.*, 2009). This might be due to the fact that young animals take longer time to regain body conditions after kidding. This situation is alarming for preferential treatment of young does to be shortening their KI (Dadi *et al.*, 2008). Variation in KI was observed between intensive and extensive production system (Faruque *et al.*, 2010). The kidding interval could be affected by change in the quality and quantity of forages, age of dam and level of nutrition and availability of buck (Jackson, 2013). Under better management conditions, both temperate and tropical goats should give kid at least three times in two years, hence the kidding intervals should not exceed beyond eight months.

**Table 1.** Kidding interval in Kamori goat managed under semi-intensive management conditions

No. of observations	Kidding Interval (days)		
	Mean ( $\pm$ SEM)	Range	
		Minimum	Maximum
120	252.43 $\pm$ 2.983	190	360

### Gestation period

The gestation is the period between successful conceptions to successful kidding. Gestation length is a genetic factor and provides less scope for manipulation (Kunbhar *et al.*, 2015). It can be judged by non-return to estrus after breeding (Ahmed *et al.*, 2014). The mean ( $\pm$ SEM) gestation length was recorded as  $151.413 \pm 0.21$  days in Kamori goat does (Table 2). The average gestation period was normally ranged between 146-155 days, with an average of 05 months in goats (Webb and Mamabolo, 2005). The results of the current study are in close agreements with the results reported by Moeen-ud Din *et al.* (2008) and Ahmed *et al.* (2014). They reported gestation period of 151.33 days, 150 days and  $148.2 \pm 3.7$  days in Beetal, Matou and South African goat does, respectively. Furthermore they reported that the duration of one day less for does bearing singletons ( $149.1 \pm 3.6$ ), twins ( $147.8 \pm 3.6$ ) and triplets ( $146.8 \pm 4.7$ ) indicates there was no significant difference in the gestation length between doe bearing singletons, twins or triplets. The doe bearing single or multiple births has no any significant effect on gestation length (Webb and Mamabolo, 2005). The large breeds have few days longer pregnancy duration than small breed goats (Ahmed, 2014).

**Table 2.** Gestation length and length of dry period in Kamori goat managed under semi-intensive management conditions

No. of observations	Gestation length (days)		Length of dry period (days)	
	Mean ( $\pm$ SEM)	Range	Mean ( $\pm$ SEM)	Range
120	151.413 $\pm$ 0.21	146-155	68.254 $\pm$ 0.289	50-90

**Dry period**

The dry period is a critical part of the lactation length in dairy animals to achieve optimal milk yield in subsequent lactation. The dry period is required for mammary glands remodeling processes, including regression, proliferation and differentiation of mammary glands (Dadi, 2008). It is the period when endocrine glands are readjusting to the next coming service and conception. The mean dry period was recorded as 68.254 $\pm$ 0.289 days during the current study under semi intensive management conditions in Kamori goat (Table 2). The acceptable dry period of dairy goat ranges between 45 to 60 days (Faruque *et al.*, 2010). Almost the similar results were obtained by others for goats under various management conditions. There was a significant effect of management system on the dry period of goat. The results obtained in the present study are in close agreements to the results (62 days) reported by Jackson (2013) in Toggenburg goat breed. During dry period the doe managed in a way to be restricted from becoming excessive fatty. If does not given required dry period usually produce less (65 to 75%) volume of milk in the subsequent lactation as compared to those does allowed extra management and care during the dry period (Faruque *et al.*, 2010). The extended long dry period causing long kidding interval, which may affect productivity of goat doe and decrease in the lifetime production.

**Milk yield**

The milk is one of the important source, which is directly related to production performance of the female animal. In present study the mean ( $\pm$ SEM) milk production was recorded as 2.7286 $\pm$ 0.018 liters per doe per day under semi intensive management condition (Table 3). The results of present investigations are in close agreement to those reported by Waheed and Khan (2013) and Khan *et al.* (2008). They reported average milk yield in between 2.5 liters per day in different indigenous goat breeds. The results of present study for milk yield in Kamori goat are in accordance with the results (2-4 liters) reported by Baloch (2014) in Kamori goat. The results of present study also fall in the same range as reported by Waheed and Khan (2013). They reported daily milk yield as 2-4 liters per doe in Beetle goat. On an average, a good dairy goat breed yielded as 2.71 liters of milk per day (Waheed and Khan, 2013). In Beetal goat does the milk yield was reported as 2.41 liters and 2.231 liters (Ali, 2006). In general similar milk yield was recorded in Beetle, Dera-Din-Panah and Kamori goat breeds (Waheed and Khan, 2013). They reported 2-4 liters milk yield in Kamori breed at various farms running in public and private sectors (Waheed and Khan, 2013). Milk production varies with management of doe and there is also variation in milk yield among different breeds and within the breed.

The goat breeds of temperate region produce more milk as compared to tropical goat breeds. Tropical goat breeds have low milk yield due to their low genetic potential and prevailing environmental conditions like stress caused by harsh weather and malnutrition. However, there are few goat breeds like the Nubian, Jamunapari, Barbari, Kamori and Beetal which produce milk on an average of 4 litres per day (Khan *et al.*, 2008). The results of current study are higher than the results reported by Khan *et al.* (2008). They reported milk yield as 1.8 liters per doe per day under various management conditions. Milk yield varies with the stage and number of lactation. In first lactation does produced small quantity of milk and as the parity progresses milk production increases until third to fourth lactation reached as peak production. Doe with twins produce more milk as compared to those with singletons (Zahraddeen *et al.*, 2009). The difference in milk yield due to litter size is probably attributed to the extra pressure and stimulation of the mammary glands as a result of the additional suckling of second kid. However, there is a good potential in indigenous goats to increase daily milk yield of doe through improved nutrition and management practices (Deribe and Taye, 2014).

Milk yield increases with increase in age and body weight and supplemented with nutrition during pregnancy may cause increase in milk yield after kidding. Management practices, nutrition, body condition and frequency of milking are also factors influencing milk production in does. The milking of doe once a day yielded less quantity of milk as compared to milking twice or more times in a day. Higher milk production was attributed to the availability of lush green grasses and good quality of feed resources during the rainy season and vice versa during the dry season (Norris *et al.*, 2011). On the other hand, low dry matter intake, reduced grazing time, cause low milk yield (Singh *et al.*, 2009). The quantity of milk produced during lactation period is affected by breed, litter size, parity and stage of lactation and health of does. A part from above stated factors, nutrition and management during lactation are the primary factors that influence the milk yield. Because of the above facts goat is getting more favors for dairy farming and can prove to be best and ideal position especially in developing countries, like Pakistan.

**Table 3.** Milk yield and lactation length in Kamori goat managed under semi-intensive management conditions

No. of observations	Milk yield per lactation (lit)		Lactation length (days)	
	Mean (lit)	Range (lit)	Mean (days)	Range (days)
120	2.7286±0.0177	1.00-2.50	112.83±0.2943	90.00 -130.00

### Lactation length

Lactation length is the period in which the doe is in milk. Lactation period is the breed's property. A breed has its own different lactation length depending on its producing ability. The quantity of milk produced to be partially influenced by lactation length. Lactation length has an obvious effect on milk yield. Increased lactation length cause increase in total milk yield, obtained for longer period (Waheed and Khan, 2013). Variations in lactation length have also been reported in different breeds and also within the breeds, climatic conditions and nutrition.

The mean lactation length was recorded as  $112.83 \pm 0.2943$  days during current study in Kamori goat (Table 3). The results of present investigations are in close matching to the results reported by Khan *et al.* (2008); Waheed and Khan (2013) and Baloch (2014). They reported an average lactation length in between 90-120 days, particularly in Beetle, Kamori and Dera-Din-Panah goat breeds of Pakistan, under various management conditions. The results of the present study are in accordance with the results obtained by Husain (1999), who reported that lactation length of Black Bengal goats was 98-105 days. In study lactation length of Black Bengal goat was 92 days, which is somewhat in accordance to the results recorded in the present study. However Eik *et al.* (2008) reported longer lactation length than the findings recorded in the present study. The similar findings (181-242 days) were also reported by Safari *et al.* (2008). The findings of present study are greater than the results reported by Chowdhury *et al.* (2002). They observed the average lactation length of Black Bengal goats at first, second and third parity was 72, 82 and 81 days, respectively. This variation is mainly due to genetic and non-genetic factors, especially genetic ability of the dams, nutrition and management. The lactation yield was positively related with the nutrition, age, genotype and season as suggested by Chowdhury *et al.* (2002). Differences in management and nutritional status of the does might be the cause for variation in lactation length and lactation yield. Poor nutrition in late pregnancy could adversely affect the lactation length in goat does.

## CONCLUSION

From this study, it can be concluded that the Kamori goat breed has a high milk yield potential and ideal kidding intervals, hence it can be utilized for milk production by implementing improved husbandry management practices on scientific lines.

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