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Survey of Reproductive Indices in Dairy Farms of Kabul City, Afghanistan

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Abstract

Dairy cows are the key source of milk production in Afghanistan, and milk is the main source of income for a dairy farm. Dairy cows are the production units in a dairy herd and dairy herds mostly consist of lactating cows. Reproductive efficiency in a dairy herd is an essential component of dairy cattle productivity around the globe and reproductive efficiency is measured by using reproductive indices. The current study was carried out in order to determine reproduction condition of dairy farms in Kabul city. Reproduction data included services per conception (SP), calving to first heat interval (CFHI), calving to first service interval (CFSI), calving to conception (CC), lactation length (LL), dry period (DP) and calving interval (CI). Data were collected by completing a questionnaire from the record book of 11 dairy farms, through interviews with principles of farms in Kabul city and analyzed by using SPSS.26. The overall mean ± SE for SC, CFHI, CFSI, CC, LL, DP and CI were 2.08 ± 0.02 times, 54.82 ± 2.06, 89.64 ± 1.22, 115.96 ± 3.18, 317.04 ± 5.11, 80.2 ± 4.14 and 398.55 ± 4.61 days, respectively.

Keywords

Reproductive Indices, Dairy Farm, Kabul City

1. Introduction

Reproduction is an important event in the life of both male and female animals. The success of a dairy farm depends on the reproductive efficiency (Roy & Ghosh, 2020). The reproductive ability of dairy cows affects the overall profitability of a dairy herd. Cows must calve down to initiate a new lactation period and the more regularly they calve down, the more profitable the dairy herd be-

comes (Muller, 2017). Dairy herd profitability is highly dependent on reproductive performance. Reproductive performance is biologically crucial and vital for the profitability of many animal production systems. Reproductive efficiency of a herd is an important component of dairy cattle productivity in the world. Economic losses because of poor fertility can be attributed to the cost of prolonged calving interval, increased insemination costs, reduced returns from calves born and forced replacements in the event of culling (Nishida et al., 2006).

Calving to conception, calving interval and the number of services per conception are the bases of profitable production for dairy farms (Woldeamanuel, 2016). Age at first service, age at first calving, calving to conception, calving interval and the number of services per conception were 991.4, 1265, 285.8, 561.3 days and 1.69 times, respectively (Fekadu et al., 2010). Services per conception, calving interval, calving to conception and dry period were 2.5 times 403, 134 and 69 days for Holstein Friesian cows in Iran (Ansari Lari et al., 2010). Calving to first service interval, dry period and calving interval were 113.34, 224.99 and 505 days, respectively (Sattar et al., 2005).

The reasons for late age at first service could be irregularities in management services and feed supply. Years and seasons of birth had no marked effect on age at first service (Haile & Yoseph, 2018). Poor efficiency of estrus detection, poor estrus detection by animals or both were the most probable management factors that accounted for longer periods of calving to the first service, calving to conception and calving interval. Improving the level of nutrition as well as the efficiency of estrus detection is required for optimal production and reproduction (Tadesse et al., 2010). Good estrus detection, good insemination technique, quality semen, and a healthy uterine environment are critical components of high reproductive efficiency (Nebel, 1999). Reproduction is a definitive factor in dairy farms. Reproduction is judged by reproductive indices. For the purpose of knowing the reproduction status of dairy cows, it is necessary to understand their reproductive indices. The objective of this study is to clarify reproduction status of dairy cattle in Kabul city dairy farms.

2. Materials and Methods

The current study was conducted in Bini hessar and ten more dairy farms in Kabul city. Bini hessar is a governmental farm the rest were private farms. At the present study data were collected from 49 cows from governmental farm and 141 cows from private farms. The animals were used belong to the Holstein Friesian breed. Data about reproductive traits were gathered by completing related questionnaires from farms record book, and data about management and feeding collected via related questionnaires and observation. In Bini hessar farm cows were grazed in the pasture during the summer, but in winter cows were fed with cotton cake, corn, silage, and dried fodder. The breeding system, cows were inseminated by artificial insemination. In private farms the whole year cows were fed with cotton cake, barley, corn, wheat barn, straw and hay. The breeding

system, cows were inseminated by artificial and natural services. In both groups of farms cows milked two times per day and water was available ad libitum.

The Collected Data were analyzed by 26 version of SPSS software program. Descriptive statistics for reproductive indices were calculated as means and standard errors. Variation in reproductive indices of cows in governmental and private farms were calculated by using Independent Simples T Test. Significance level was $p < 0.05$.

3. Results and Discussion

Overall data about reproductive traits of 190 Holstein Friesian cows were collected for the current study. The reproductive indices are presented in Table 1. As shown in Table 1, the mean ± SE for services per conception, calving to first heat interval, calving to first service interval, calving to conception, lactation length, dry period and calving interval were 2.08 ± 0.02 times, 54.82 ± 2.06, 89.64 ± 1.22, 115.96 ± 3.18, 317.04 ± 5.11, 80.2 ± 4.14 and 398.55 ± 4.61 days, respectively.

The mean SPC of 2.08 times obtained in the present study is higher than 1.92 times reported by Haile and Yoseph (2018) in Ethiopia; however, lower than 3.07 and 2.5 times reported by Sattar et al. (2005) and Ansari Lari et al. (2010) in Pakistan and Iran, respectively. Successful service depends on many factors such as quality of semen, skills of inseminator, proper time of insemination and cows' related factors (Haile & Yoseph, 2018).

The mean for CFHI in this study is 54.82 days. The mean CFSI of 89.64 days is longer than 68 days obtained for Holstein Friesian cows in Iran (Ansari Lari et al., 2010), in contrast, shorter than 156 and 113 days for Holstein Friesian cows in Ethiopia and Pakistan (Haile & Yoseph, 2018; Sattar et al., 2005). Poor estrus detection by herdsman and poor estrus expression by dairy cows contributes to long CFSI. Although, under an intensive modern dairy production system where animals are housed in the dairy barn (concrete floor), it is very difficult for the animal to adequately manifest behavioral oestrus including mounting activity

Table 1. Mean for reproductive indices in dairy farms.

Reproductive traits	Mean ± SE			Sig
	Overall city	Private farms	Governmental farm	
Services per conception (t)	2.08 ± 0.02	2.14 ± 0.17	1.98 ± 0.11	**
Calving to first heat interval (d)	54.82 ± 2.06	53.69 ± 5.74	57.35 ± 7.96	*
Calving to first service interval (d)	89.64 ± 1.22	89.10 ± 3	91.03 ± 8.26	NS
Calving to conception (d)	115.96 ± 3.18	116.72 ± 9.44	114.27 ± 13.51	*
Lactation length (d)	317.04 ± 5.11	316 ± 12.33	322.54 ± 9.1	*
Dry period (d)	80.2 ± 4.14	81.64 ± 15.07	75.42 ± 10.99	**
Calving interval (d)	398.55 ± 4.61	399.04 ± 8.17	396.91 ± 14.53	NS

*$p < 0.05$; **$p < 0.01$; SE: Standard Error; NS: Non-significant; t: times; d: days.

(Tadesse et al., 2010).

The average CC of 115.96 days revealed in this study is shorter than the reported value of 285.8, 222.22, and 128.28 days for Holstein Friesian cows in Ethiopia, Pakistan and Baluchistan (Fekadu et al., 2010; Sattar et al., 2005; Barozai et al., 2011). The calving to conception interval or days open is a valuable index reflecting efficiency of estrus detection and the fertility of both females and males in a herd (Hafez & Hafez, 2000). The variation in calving to conception is due to differences in the management, environment and fertility status of the breeding cows (Sattar et al., 2005).

The mean LL of 317.04 days obtained in the present study is longer than 291.86 and 294.10 days for Holstein Friesian cows in Sudan and Pakistan (z. Abdel Gader et al., 2007; Sattar et al., 2005), conversely, Ansari Lari et al. (2010) reported 334 days LL for Holstein Friesian cows in Iran, which is higher than LL 317.04 days in current study.

The mean DP of 80.2 days obtained in this study is longer than 60 days reported by Ansari Lari et al. (2010) for Holstein Friesian cows in Iran; however, shorter than 224.99 and 164.08 days reported by Sattar et al. (2005) and z. Abdel Gader et al. (2007) for Holstein Friesian cows in Pakistan and Sudan. Feeding and breeding are effective factors during the dry period.

The overall mean CI of 398.75 days in the current study is shorter than 505.02, 445 and 403 days in Holstein Friesian cows in Pakistan, Ethiopia and Iran (Sattar et al., 2005; Tadesse et al., 2010; Ansari Lari et al., 2010). The optimal calving interval for both beef and dairy cattle is 12 months, but 12-month intervals are seldom achieved (Hafez & Hafez, 2000). The differences in calving interval are because of the level of milk production and reproduction management.

From the above findings, it may be concluded that the reproduction status of dairy cattle in the study area is sub-optimal, the same as the reports of other authors. There is need for better management, reproduction management and feeding for optimal reproduction.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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