

Original Research Article

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Estimation of Lactation Persistency in Different Classes of Crossbred Jersey and Red Sindhi Cows

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ABSTRACT

Lactation persistency is a critical economic factor in the dairy cow production system. It refers to a cow's ability to continue producing milk after it has reached its peak. Milk yield is an important trait in dairy industry; thus, information regarding this phenotype is essential to measure the productivity of a farm. This article aims to estimate the persistency of milk yield in lactation first of various grades of $\frac{1}{2}$ Jersey \times $\frac{1}{2}$ Red Sindhi, $\frac{1}{4}$ Jersey \times $\frac{3}{4}$ Red Sindhi, $\frac{3}{8}$ Jersey \times $\frac{5}{8}$ Red Sindhi, $\frac{1}{8}$ Jersey \times $\frac{7}{8}$ Red Sindhi crossbred of cows. Data was collected from pedigree cum history sheet. Milk yield from the first lactations (L1) of 83 cows and 498 observations of various grades of Jersey x Red Sindhi crossbred cows were recorded in kilograms. Samples were collected up to six months. The mean of milk yield for six months in L1 were 168.93 ± 6.46 kg of $\frac{1}{2}$ Jersey \times $\frac{1}{2}$ Red Sindhi crosses, 176.72 ± 4.73 kg of $\frac{1}{4}$ Jersey \times $\frac{3}{4}$ Red Sindhi crosses, 158.64 ± 10.66 kg of $\frac{3}{8}$ Jersey \times $\frac{5}{8}$ Red Sindhi crosses, 157.63 ± 4.86 kg of $\frac{1}{8}$ Jersey \times $\frac{7}{8}$ Red Sindhi crosses, respectively. The peak of milk yields was achieved at the second month of the lactation for L1 were 190.78 - 274.63 kg of $\frac{1}{2}$ Jersey \times $\frac{1}{2}$ Red Sindhi crosses, 162.29 - 310.71 kg of $\frac{1}{4}$ Jersey \times $\frac{3}{4}$ Red Sindhi crosses, 155.16 - 267 kg of $\frac{3}{8}$ Jersey \times $\frac{5}{8}$ Red Sindhi crosses, 142.32 - 283.99 kg of $\frac{1}{8}$ Jersey \times $\frac{7}{8}$ Red Sindhi crosses, respectively. The persistency of milk yield for L1 were 2.51 ± 0.16 of $\frac{1}{2}$ Jersey \times $\frac{1}{2}$ Red Sindhi crosses, 2.30 ± 0.09 of $\frac{1}{4}$ Jersey \times $\frac{3}{4}$ Red Sindhi crosses, 2.62 ± 0.22 of $\frac{3}{8}$ Jersey \times $\frac{5}{8}$ Red Sindhi crosses, 2.58 ± 0.14 of $\frac{1}{8}$ Jersey \times $\frac{7}{8}$ Red Sindhi crosses respectively. Milk yield persistency is the ability of animal to maintain milk production after reaching its peak yield during lactation period. The more persistent dairy cattle show better performance. The present study concluded that persistency of cows could be useful in selecting those have the higher estimates in order to improve the productivity of the herds.

Keywords

Milk yield, Persistency, Various grades, Crossbred, Cattle, Lactation order

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Introduction

Lactation persistency is described as a cow's capacity to retain greater levels of output beyond peak yield. Very persistent cows give more milk, have a longer productive life, and are considered efficient producers, providing farmers with a

consistent stream of revenue throughout the year. Cows are persistent if they retain their highest production throughout the lactation period (Grossman *et al.*, 1999). Jamrozik *et al.*, (1998) defined lactation persistency as an animal's capacity to continue producing milk at a high level after reaching the peak of her lactation. In theory, more

persistent cows are less prone to health and reproductive problems. Because of its influence on feed prices, health, and reproduction, persistence is an economically important feature (Swalve, 1998; Swalve, 2000). Ohashi *et al.*, (1990) and Strabel *et al.*, (2002) defined persistency as the capacity of cows to retain their highest daily output for the longest feasible duration following the peak of their production. Gengler *et al.*, (1998) defined persistency as a flat curve for daily milk supply throughout the lactation period that does not fall soon after the peak. According to VanRaden (1998) and Koloj *et al.*, (2018), cows with high persistency produce more milk at the conclusion of the lactation period and less milk at the beginning. Environmental factors such as genetic group, sire impact, herd management, lactation number, feeding, gestation, and animal calving season all influence lactation persistence.

The quantity of milk produced during a lactation period reflects biological parameters of the cow, farm management, and economic performance. To estimate lactation persistency would you like to become a more attractive partner for dairy because you deliver your milk and offer a more stable milk supply throughout the year.

Then, because later peak yield and a flatter lactation curve result in higher persistency, it is critical to understand how to use lactation persistency as a management tool. A flat lactation curve relieves the cow of stress, lowering the chance of issues caused by a negative energy balance. If you focus on enhancing persistency, you will have an easier-to-manage herd with good health and fertility. More perseverance equals less stress on the cow.

High persistency bulls will produce daughters with a flatter lactation curve and a lower lactation output than projected. Choose sires with a breeding value for persistency greater than 100 when looking for bulls to increase persistency. A higher rating indicates greater perseverance. The goal of this study was to investigate the persistency of milk production in various classes of crossbred cows and

locations using various methodologies, and to estimate the persistency of cows based on their ability values of milk production in order to pick those with the highest estimates.

Materials and Methods

Four different grades of crossbred dairy cattle ($\frac{1}{2}$ Jersey x $\frac{1}{2}$ Red Sindhi, $\frac{1}{4}$ Jersey x $\frac{3}{4}$ Red Sindhi, $\frac{3}{8}$ Jersey x $\frac{5}{8}$ Red Sindhi, $\frac{1}{7}$ Jersey x $\frac{7}{8}$ Red Sindhi) belongs to Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India used in this study.

The data pertained to present research work were collected from the pedigree cum history sheet maintained at the Department of Animal Husbandry and Dairying, SHUATS Prayagraj, Uttar Pradesh.

The records of persistency of dairy crossbred cattle were 15, 26, 9, 33 and observation 90, 198, 54, 156 respectively. The total observation of various grades of crossbred cattle was 498. (Hermiz and Hadad, 2019) described details of management, feeding, health program, mating system, as well a special form arranged to be suitable to record the information for each farm in order to calculate the persistency and the factors affecting.

Persistency

There were several methods to measure the persistency (Madsen, 1975), but the Mahadevan method were used in this study.

Lactation Persistency for $\frac{1}{2} \times \frac{1}{2}$, $\frac{1}{4} \times \frac{3}{4}$, $\frac{3}{8} \times \frac{5}{8}$, $\frac{1}{8} \times \frac{7}{8}$ Jersey x Red Sindhi crosses.

Persistency estimated by Mahadevan's Method

$$P = \frac{A-B}{B}$$

Where:

A = total lactation yield in six months

B = initial milk yield in the first two months of lactation as the peak production was considered to reach by two months.

Results and Discussion

The persistency of milk yield in first lactation of 1/2 Jersey × 1/2 Red Sindhi crosses, 1/4 Jersey × 3/4 Red Sindhi crosses, 3/8 Jersey × 5/8 Red Sindhi crosses, 1/8 Jersey × 7/8 Red Sindhi crossbred cows observed in this study were 2.51±0.16, 2.30±0.096, 2.62±0.22, 2.58±0.14 respectively. The mean value of persistency by Mahadevan method was reported as 1.61±0.04, 1.40±0.02, 11.00±0.71, 2.98±0.20 by Shafiq *et al.*, (1994). The present finding is in agreement with the report of Shingare *et al.*, (2015) in Deoni cattle. The values mentioned indicate that the various grades of crossbred cows included in this study have good persistency in their milk yield, which was previously confirmed by VanRaden (1998); Koloji *et al.*, (2018), claimed that cows with high persistency produce milk more than expected at the end of the lactation period and less than expected at the beginning. The lactation persistency revealed in Table.1. The pertaining of data from eighty-three cows which have recording from two lactation periods housed in the same barn were used in the analysis by Mahadevan methods. Records were obtained from calving to six-month milk yield. The mean of monthly milk yield for L1 were 168.93±6.46 kg of 1/2 Jersey × 1/2 Red Sindhi crosses, 176.72±4.73Kg of 1/4 Jersey × 3/4 Red Sindhi crosses, 158.64±10.66 kg of 3/8 Jersey × 5/8 Red

Sindhi crosses, 157.63±4.86kg of 1/8 Jersey × 7/8 Red Sindhi crosses respectively. It has been stated that the lactation persistency is impacted by environmental variables such as common herd impacts, amount of milk output, year of calving and production, milking frequency and season of calving and production (Yilmaz and Koc, 2013; Bouallegue *et al.*, 2013; Portillo and Pollott, 2011).

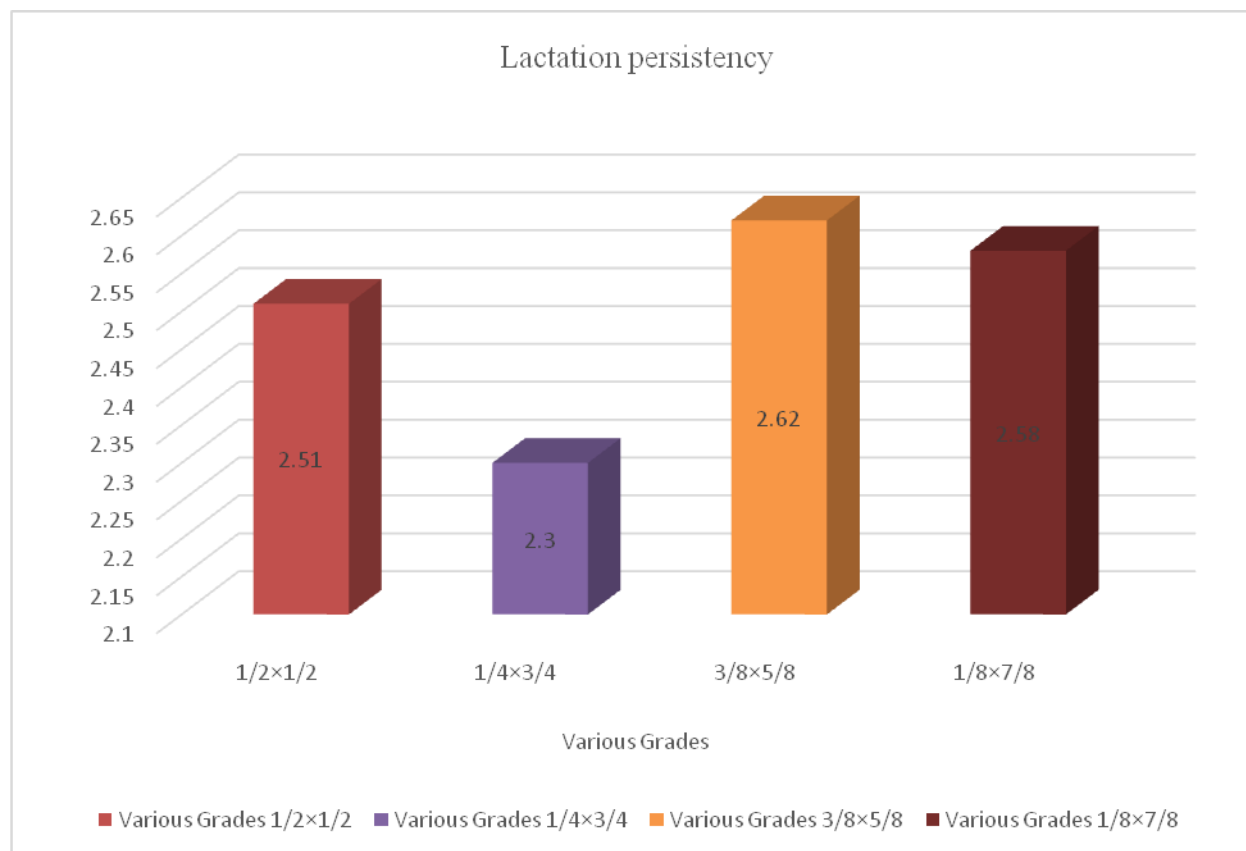
Persistency varies between herds due to differences in management, food, and other environmental variables, as well as yearly weather fluctuations. Cows raised in high yield herds exhibit stronger persistency than cows raised in low yield herds. Numerous prevalent health traits and disorders such as lameness, metritis, ketosis, mastitis and displaced abomasum in dairy cattle might impair persistency (Appuhamy, 2006). The increased breastfeeding persistency is related with improved health and reduced illness incidence (Cole *et al.*, 2009).

Somatic cell count and mastitis are two of the most important health parameters associated with milk output persistency. Lactation persistency is an important feature to determine lactation yield which has different definition and several ways to calculate. It is concluded that various grades of 1/2 Jersey × 1/2 Red Sindhi crosses, 1/4 Jersey × 3/4 Red Sindhi crosses, 3/8 Jersey × 5/8 Red Sindhi crosses, 1/8 Jersey × 7/8 Red Sindhi crosses cow, highest lactation persistency was found in blood inheritance of 3/8 Jersey × 5/8 and lowest 1/4 Jersey × 3/4 Red Sindhi crosses in first lactation.

Table.1

Factor Jersey x Red Sindhi crosses	Number of Observation	Persistency Index
1/2 × 1/2	90	2.51 ± 0.16
1/4 × 3/4	198	2.30± 0.09
3/8 × 5/8	54	2.62± 0.22
1/8 × 7/8	156	2.58 ± 0.14

Fig.1 Graphical representation of lactation persistency in various grades of Jersey × Red Sindhi crossbred cows



The present study concluded that, the estimate of persistency of cows depending on the ability values of their milk production could be useful in selecting those have the higher estimates in order to improve the productivity of the herds.

Several factors associated with environment and management might be interact each other in this regard. Moreover, the persistency value from this test institution could be used as the standard in evaluation the productivity and efficiency of dairy farm in India.

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