

International Journal of Agriculture Extension and Social Development

Volume 7; SP-Issue 1; Jan 2024; Page No. 13-15

Received: 27-10-2023
Accepted: 02-12-2023

Indexed Journal
Peer Reviewed Journal

Evaluation of milk persistency of second lactation in several grading of Jersey x Red Sindhi crossbred cows

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DOI: <https://doi.org/10.33545/26180723.2024.v7.i1Sa.268>

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Abstract

One crucial aspect of the dairy cattle production system's economy is lactation persistency. It refers to a cow's capacity to continue producing milk even after it peaks. Since milk output is a significant characteristic in the dairy business, knowledge of this phenotype is crucial for assessing a farm's productivity. The purpose of this paper is to assess the persistency of milk output in different classes of cow crossbreds: ½ Jersey × ½ Red Sindhi, ¼ Jersey × ¾ Red Sindhi, 3/8 Jersey × 5/8 Red Sindhi, and 1/8 Jersey × 7/8 Red Sindhi. Information was gathered from the pedigree cum history sheet kept at the Department of Animal Husbandry and Dairying, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India. Milk yield from the second (L2) lactations 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 L2 were 170.53±6.80 kg of ½ Jersey × ½ Red Sindhi crosses, 180.81±4.36 Kg of ¼ Jersey × ¾ Red Sindhi crosses, 156.63±5.69 kg of 3/8 Jersey × 5/8 Red Sindhi crosses, 155.64±4.46 kg of 1/8 Jersey × 7/8 Red Sindhi crosses respectively. The peak of milk yields was achieved at the second month of the lactation L2 were 194.23 - 314.14 kg of 1/2 Jersey × 1/2 Red Sindhi crosses, 164.42 - 304.81 kg of 1/4 J x 3/4 RS, 156.94 - 250.38 kg of 3/8 Jersey × 5/8 Red Sindhi crosses and 156.53 - 260.63 kg of 1/8 Jersey × 7/8 Red Sindhi crosses, respectively. The persistency of milk yield for L2 were 2.13±0.13 of ½ Jersey × ½ Red Sindhi crosses, 2.20±0.07 of ¼ Jersey × ¾ Red Sindhi crosses, 2.33±0.12 of 3/8 Jersey × 5/8 Red Sindhi crosses, 2.21±0.07 of 1/8 Jersey × 7/8 Red Sindhi crosses respectively. The capacity of an animal to continue producing milk after attaining its peak yield during the lactation phase is known as milk yield persistency. Dairy animals that are more tenacious perform better. The current study came to the conclusion that, in order to increase herd production, persistence of cows may be helpful in choosing those with higher estimations.

Keywords: Milk yield, persistency, various grades, crossbred, cattle

Introduction

The ability of a cow to continue producing at higher levels after reaching her peak yield is known as lactation persistency. Extremely tenacious cows are thought to be efficient producers, yielding higher milk yields over the course of the year, and they live longer productive lives. If cows continue to produce at their maximum level over the lactation period, they are considered persistent (Grossman M, Hartz SM, and Koop's WIG. *et al.* 1999) [7]. Lactation persistency was described by Jamrozik, G., *et al.* (1998) [8] as the ability of an animal to continue producing milk at a high level even after lactation peaks. Theoretically, persistent cows are less likely to experience reproductive and health issues. Because of its influence on feed prices, health, and reproduction, persistence is an economically important feature (Swalve, H.H., 1998) [16]. Strabel, *et al.* (2002) [15] and (Gengler, N. *et al.* 1998) [6] defined persistency as the capacity of cows to retain their highest daily output for the longest feasible duration following the

peak of their production. The persistency as a flat curve for daily milk supply throughout the lactation period that does not fall soon after the peak. According to (Kole, *et al.* 2018) [9] cows with high persistency produce more milk at the conclusion of the lactation period and less milk at the beginning. Environmental variables that affect lactation persistence include diet, gestation, animal calving season, herd management, genetic group, sire impact, and lactation number. The quantity of milk produced in a lactation period is a function of the cow's biology, farm management, and economic efficiency. Would you like to become a more desirable partner for dairy because you give your milk and provide a more consistent milk production all year long, in order to estimate lactation persistency. According to Belayneh K. *et al.* (2001) [2], a flatter lactation curve and a later peak yield led to increased persistency, thus it's critical to comprehend how to employ this trait as a management tool. A flat lactation curve puts less stress on the cow, and that reduces the risk of problems caused by a negative

energy balance (Alim, K.A., *et al.*; 1990) ^[1]. Focusing on increasing persistency will pay off in the form of a more manageable herd with excellent health and fertility. Bulls with high persistence will generate daughters that have a flatter lactation curve and a lower-than-expected yield in the later stages of lactation. Select sires with a breeding value for persistency greater than 100 when searching for bulls to promote persistency (Capuco A. V., *et al.* 2003) ^[4]. Higher scores correspond to more tenacity. The purpose of this research was to determine the persistence of milk production in different crossbred cow classes and geographical areas using different approaches. The ability values of milk production were used to estimate the persistence of individual cows, with the highest estimations being selected.

Materials and Methods

Four various grades of crossbred dairy cattle (1/2 Jersey x 1/2 Red Sindhi, 1/4 Jersey x 3/4 Red Sindhi, 3/8 Jersey x 5/8 Red Sindhi, 1/8 Jersey x 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, 33, 9, 26 and observation 90, 198, 54, 156, respectively. The total observation of various grades of crossbred cattle was 498. A cow was said to be in a normal lactation when she produced milk for more than 200 days. In order to determine the persistency and the variables influencing, Madsen, O. (1975) ^[10] provided data on the management, feeding, health programme, mating system, and a particular form designed to be suited for recording the information for each farm. Persistency: The Mahadevan approach was employed in this study, although there were other ways to quantify persistency (Shafiq, M., *et*

al. 1994) ^[13].

Lactation Persistency for 1/2 x 1/2, 1/4 x 3/4, 3/8 x 5/8, 1/8 x 7/8 Jersey x Red Sindhi crosses.

Persistency evaluated by Mahadevan’s Method

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

Where

A = total lactation yield in 180 days

B = initial milk yield in the 1st 10 weeks of lactation as the peak production was considered to reach by 10 weeks.

Results and Discussion

The persistency of milk yield in second lactation of 1/2 Jersey x 1/2 Red Sindhi crosses, 1/4 Jersey x 3/4 Red Sindhi crosses, 3/8 Jersey x 5/8 Red Sindhi crosses, 1/8 Jersey x 7/8 Red Sindhi crossbred cows observed in this study were 2.13±0.13, 2.20±0.07, 2.33±0.12, 2.21±0.07 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 (Shingare, V.M., *et al.* 2015) ^[14]. The current results corroborate the findings of Yilmaz H. *et al.* (2013) ^[17] in Deoni cattle. The values mentioned suggest that the different grades of crossbred cows included in this study have good persistency in their milk yield, and it is stated that cows with high persistency produce less milk at the beginning of the lactation period and more milk at the end.

Factor Jersey x Red Sindhi crosses	Number of Observation	Persistency Index Second Lactation
1/2 x 1/2	90	2.13±0.13
1/4 x 3/4	198	2.20±0.07
3/8 x 5/8	54	2.33±0.12
1/8 x 7/8	156	2.21±0.07

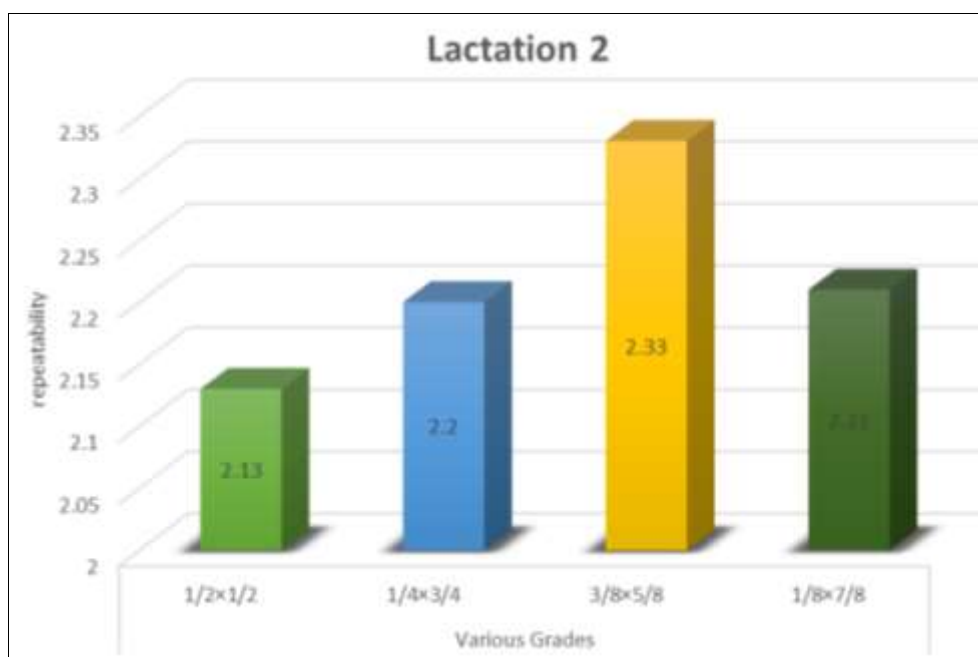


Fig 1: Graphical representation of Lactation persistency in various grades of Jersey x Red Sindhi crossbred cows

The Mahadevan techniques of analysis were used to eighty-three cows that were kept in the same barn and had records from two lactation periods. Data from the time of calving to the six-month milk yield was collected. For L2, the average monthly milk output was 170.53 ± 6.80 kg for $\frac{1}{2}$ Jersey \times $\frac{1}{2}$ Red Sindhi crosses, 180.81 ± 4.36 kg for $\frac{1}{4}$ Jersey \times $\frac{3}{4}$ Red Sindhi crosses, 156.63 ± 5.69 kg for $\frac{3}{8}$ Jersey \times $\frac{5}{8}$ Red Sindhi crosses, and 155.64 ± 4.46 kg for $\frac{1}{8}$ Jersey \times $\frac{7}{8}$ Red Sindhi crosses, in that order.

According to Bouallegue M. *et al.* (2013)^[3] and Portillo *et al.* (2011)^[12], lactation persistency is influenced by environmental factors such as common herd influences, milk output volume, year of calving and production, frequency of milking, and season of calving and production. Zurwan, A. *et al.* (2017)^[18], Because of variations in diet, care, and other environmental factors, as well as annual weather variations, persistence varies throughout herds. Compared to cows bred in low yield herds, cows raised in high yield herds show more perseverance. Persistency may be hampered by a number of common health conditions and characteristics in dairy cattle, including lameness, metritis, ketosis, mastitis, and displaced abomasum (Cole, J. *et al.* 2009)^[5]. The increased breastfeeding persistency is related with improved health and reduced illness incidence^[16]. Somatic cell count and mastitis are two of the most important health parameters associated with milk output persistency.

Conclusion

Lactation persistency, which has several definitions and methods of calculation, is a crucial component in determining lactation yield. The findings indicate that there are different grades of Red Sindhi crosses: $\frac{1}{2}$ Jersey \times $\frac{1}{2}$, $\frac{1}{4}$ Jersey \times $\frac{3}{4}$, $\frac{3}{8}$ Jersey \times $\frac{5}{8}$, and $\frac{1}{8}$ Jersey \times $\frac{7}{8}$. The highest lactation persistency was observed in the blood inheritance of $\frac{3}{8}$ Jersey \times $\frac{5}{8}$, while the lowest lactation persistency was found in $\frac{1}{2}$ Jersey \times $\frac{1}{2}$ Red Sindhi crosses in the second lactation. The current study came to the conclusion that, in order to increase herd productivity, choosing cows with greater persistency estimations based on milk production ability values might be helpful.

Acknowledgement

The Department of Animal Husbandry and Dairying at Sam Higginbottom University of Agriculture, Technology and Sciences in Prayagraj, Uttar Pradesh, India, supplied the data presentation for this research paper.

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