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Genetic studies on calving interval and its influence on dry period and butter fat yield crossbred cattle

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Abstract

Animal husbandry is dependent on each other, mainly because of small holding of land by majority of the farmer. Unlike the agricultural Western countries, Indian Agriculture depends almost entirely on cattle to meet its draught requirement. The present study was conducted on Genetic studies on calving interval and its influence on some important economic traits in crossbred cattle. The data for study were collected from history sheet records maintained at the Department of Animal husbandry and Dairying, Sam Higginbottom University of Agriculture, Technology and Sciences Prayagraj, (211007) Uttar Pradesh. Shorter dry period was also observed in calving interval period of 360-450 days among the different crossbred Cows 1/8 jersey X 7/8 Red Sindhi, 1/4 jersey X 3/4 Red Sindhi. The calving intervals the dry period of 1/8 Jersey × 7/8 Red Sindhi crossbred cattle ranged from 26 to 72. Days. The differences in the dry period of 1/8 Jersey × 7/8 Red Sindhi crossbred cattle between calving intervals groups were Non-significant. The butter fat yield of 1/8 Jersey × 7/8 Red Sindhi cross bred cows range from 60 to 142.27 kg. The differences in the butter fat yield (BFY) of 1/8 Jersey × 7/8 Red Sindhi crossbred cows due to different calving intervals were non-significant. Among these Cross bred animals. 1/4 Jersey X 3/4 Red Sindhi has highest 305 Lactation milk yield, Shorter dry period, highest Butter fat yield Irrespective of calving intervals the dry period of 1/4 Jersey × 3/4 Red Sindhi crossbred cattle ranged from 21.0 to 200.0. Days. The differences in the dry period of 1/4 Jersey × 3/4 Red Sindhi crossbred cattle between calving intervals groups were Non-significant. The butter fat yield of 1/4 Jersey × 3/4 Red Sindhi cross bred cows range from 57.00 to 152.2 kg. The differences in the butter fat yield (BFY) of 1/4 Jersey × 3/4 Red Sindhi crossbred cows due to different calving intervals were non-significant. The mean dry period of 1/4 Jersey × 3/4 Red Sindhi crossbred cattle pertaining to 360 days, 390 days, 420 days, 450 days and above 450 days was 39.7, 55.2, 78.3, 64.0, 90.3 days respective.

Keywords: Jersey, Red Sindhi, complete lactation milk, dry period, butter fat yield

Introduction

The performance of dairy cattle is affected by the certain physiological as well as environmental factor and for estimating of correct estimate of genetic for worth of animal due consideration should be given to these factors economical character of cattle are not independent character is one way or other one affect the other season of calving also has great effect of milk production in especially in crossbred cattle as they contain percentage of exotic blood belong to temperature region milk production performance is one of the major economic traits in dairy cattle selection program reliable information of production pedigree recorded animal particular in village condition are not available that is why at the time of selection of any breed and each individual superiority it depends on various economic traits expressed by female during here like having a good correlation with milk production from the very beginning animal breeds have tried of established a close relationship between early express traits and milk production the selection of dairy animal is possible at an early stage of lactation.

Livestock production plays a important role in the rural economy of the developing countries like India. It is an accepted fact from Arias and even today that cattle are supposed as a wealth. India possesses largest bovine population in the world 185.18 million cattle and 100.65 million buffaloes. Present scenario indicates that Indian agriculture is an economic symbiosis of crop and cattle production. It provides major source of income, as well as employment to millions of rural population.

Milk yield is the result of interaction between genetic constitution of animal and its environment in which they thrive. To achieve maximum productivity the deliberate manipulation of the phenotype of animal as well as environment is necessary and this

manipulation should result in attainment of a suitable balance between the genetic capability and the environment. Milk yield is complex characters observed at later age and thus direct selection for it, may not be very efficient at an early age. Hence, selection for milk yield may be based on highly heritable but easily associated with milk yield. Since 1934 the programme of crossbreeding for dairy cattle was started at the Allahabad agriculture institute. The impact of crossbreeding of cattle was to increase production of milk and availability of milk. Now India ranks first in milk production in the world (140.6 MT) and milk output accounts for 9.8 percent of GNP in India. Indigenous breeds viz. Kankrej, Gir, Haryana, Sahiwal and Red Sindhi were crossed to Holstein Friesian, Brown-Swiss, Jersey and Guernsey at the Agricultural Institute, Naini, Allahabad. The idea was to increase milk yield of indigenous breeds. The results of crossbreeding suggested that Red Sindhi x Jersey crosses had the most desirable traits for Indian conditions. These include small body size, better adaptability and high fat percentage. The Jersey crossbreds between 3/8 and 5/8 have been interbred and named as 'Jersind'. Similarly, 3/8-5/8 Brown-Swiss x Red Sindhi crosses have been interbred and named as "Brown Sind". Jersind crosses gave milk yield between 1557 and 1861 kg in first lactation. The breed has shown deterioration over the years mainly because of small numbers and being confined to the Institute farm.

Materials and methods

The data for study were collected from history sheet records maintained at the Department of Animal husbandry and Dairying, Sam Higginbottom University of Agriculture, Technology and Sciences Prayagraj, (211007) Uttar Pradesh

Result and discussion

Studies on economic traits in dairy animals have been in progress, therefore, the present study entitled To determine

the effect of Calving Interval on subsequent dry period (days) And To determine the effect of Calving Interval on subsequent total butter fat yield (kg). The results obtained are being presented and discussed in this chapter:

Calving interval wise dry period (days)

Table 1: Dry period of 1/8 Jersey × 7/8 Red Sindhi crossbred cows as influenced by different calving intervals

Sr. No.	360 days	390 days	420 days	450 days	Above 450 days
1.	68.0	56.0	64.0	68.0	48.0
2.	55.0	43.0	68.0	62.0	71.0
3.	54.0	69.0	69.0	45.0	67.0
4.	59.0	61.0		68.0	57.0
5.	45.0	26.0			72.0
6.		68.0			65.0
7.					58.0
Mean	56.2	53.8	67.0	60.8	62.6

Table 2: ANOVA for the data on Dry period of 1/8 Jersey × 7/8 Red Sindhi (kg) contain table 4.17

Source of Variation	D.F	S. S	M.S. S	F. value		Result
				F-cal	5% Tab	
Between the Sample	4	488.0624	122.0156	0.878931662	2.87	NS
Within the Sample	20	2776.452	138.8226			
Total	24					

Calving interval (CI)

	420 days	Above 450 days	450 Days	360 Days	390 Days
Treatment	C	E	D	A	B
Mean Dry Period	67	62.57	60.75	56.20	53.83

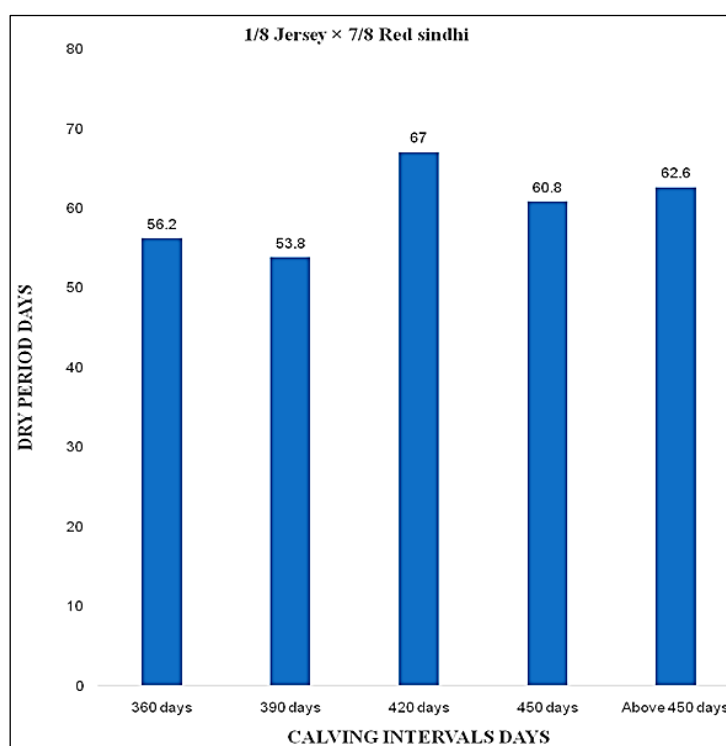


Fig 1: Dry period of 1/8 Jersey × 7/8 Red Sindhi crossbred cows as influenced by different calving intervals

Calving intervals calving interval wise dry period (days)

Table 3: Dry period of 1/4 Jersey × 3/4 Red Sindhi crossbred cows as influenced by different

Sr. No.	360 days	390 days	420 days	450 days	Above 450 days
1.	68.0	51.0	56.0	69.0	61.0
2.	30.0	55.0	95.0	66.0	71.0
3.	21.0	59.0	91.0	58.0	200.0
4.		72.0	71.0	63.0	47.0
5.		21.0			79.0
6.		39.0			63.0
7.		58.0			66.0
8.		83.0			67.0
9.		45.0			70.0
10.		69.0			175.0
11.					94.0
Mean	39.7	55.2	78.3	64.0	90.3

Table 4: ANOVA for the data on Dry period of 1/4 Jersey × 3/4 Red Sindhi (kg) contain table 4.19

Source of Variation	D.F	S. S	M.S. S	F. value		Result
				F-cal	5% Tab	
Between the Sample	4	9886.27	2471.568	2.209929299	2.73	NS
Within the Sample	27	30196.59	1118.392			
Total	31					

Calving interval (CI)

	Above 450 days	420 days	450 Days	390 Days	360 Days
Treatment	E	C	D	B	B
Mean Dry Period	90.22	78.25	64.00	55.20	39.70

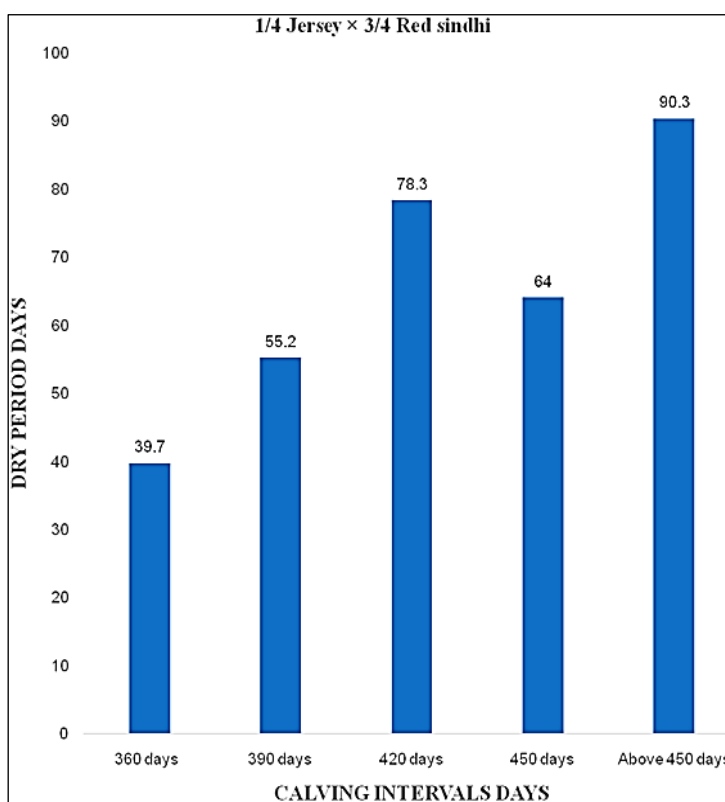


Fig 2: Dry period of 1/4 Jersey × 3/4 Red Sindhi crossbred cows as influenced by different calving intervals

Calving interval wise Butter Fat yield (kg)

Table 5: Butter Fat yield (kg) of 1/8 Jersey × 7/8 Red Sindhi (kg) crossbred cows as influenced by different calving intervals

Sr. No.	360 days	390 days	420 days	450 days	Above 450 days
1.	60	67.36	106.54	81.86	100.45
2.	74.59	76	68.1	111.68	101.2
3.	74.09	99	74	64	131.22
4.	82.36	83.68		69	106.22
5.	63.01	74			123.31
6.		83.68			142.27
7.					64.63
Mean	70.81	80.62	82.88	81.64	109.9

Table 6: ANOVA for the data on Butter Fat yield (kg) of 1/8 Jersey × 7/8 Red Sindhi (kg) contain table 4.25

Source of Variation	D.F	S. S	M.S. S	F. value		Result	CD 5%
				F-cal	5% Tab		
Between the Sample	4	5389.631	1347.408	3.593029	2.87	S	20.97
Within the Sample	20	7500.121	375.0061				
Total	24						

Calving interval (CI)

	Above 450 days	420days	450 Days	390Days	360 Days
Treatment	E	C	D	B	A
Mean (BFY)	109.9	82.88	81.64	80.62	70.81

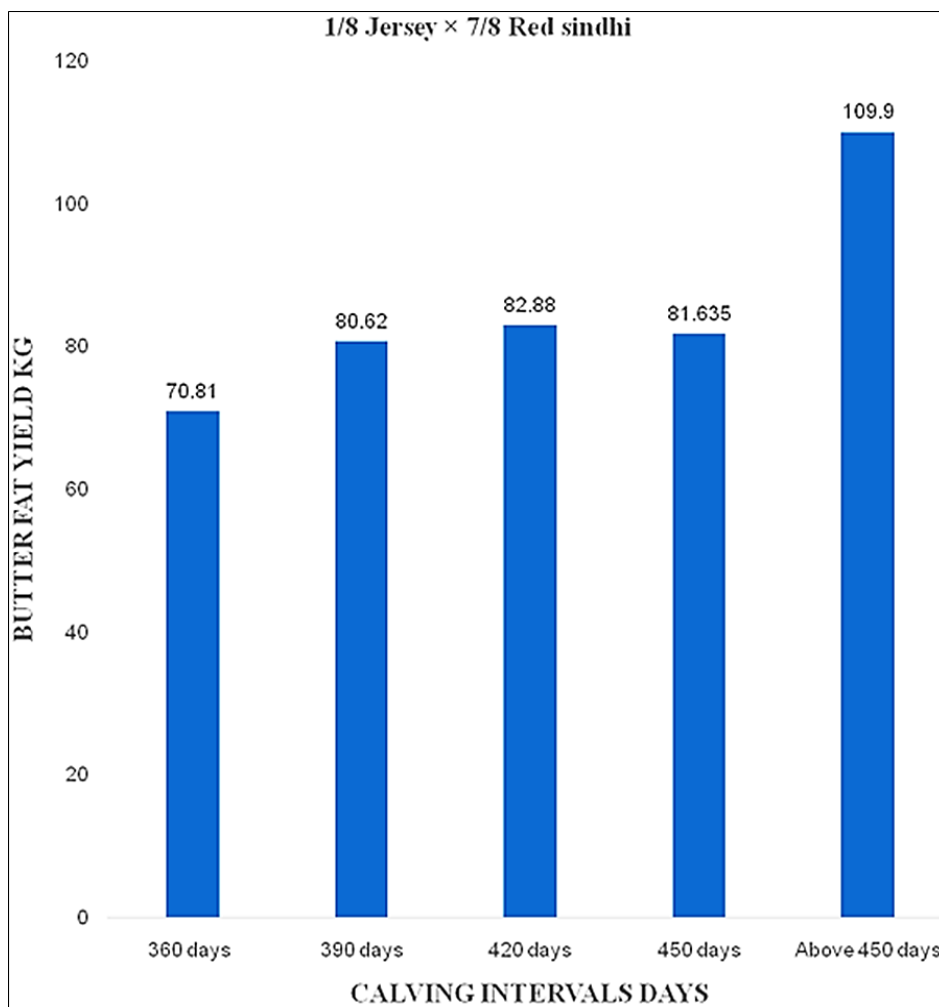


Fig 3: Butter Fat yield (kg) of 1/8 Jersey × 7/8 Red Sindhi (kg) crossbred cows as influenced by different calving interval

Calving interval wise Butter Fat yield (kg)

Table 7: Butter Fat yield (kg) of 1/4 Jersey × 3/4 Red Sindhi (kg) crossbred cows as influenced by different calving intervals

Sr. No.	360 days	390 days	420 days	450 days	Above 450 days
1.	101.0	102.0	74.1	95.9	100.0
2.	98.2	65.8	59.1	121.1	106.5
3.	62.1	93.3	88.6	103.3	88.4
4.		112.7	89.7	128.8	138.6
5.		117.1			85.6
6.		65.9			134.9
7.		61.6			152.2
8.		98.3			107.9
9.		62.1			61.0
10.		66.6			57.0
11.					79.4
Mean	87.1	84.6	77.9	112.3	101.0

Table 8: ANOVA for the data on Butter Fat yield (kg) of 1/4 Jersey × 3/4 Red Sindhi (kg) contain table 4.27

Source of variation	D.F	S. S	M.S. S	F.value		Result
				F-cal	5% Tab	
Between the sample	4	3929.908	982.4769	1.5732136	2.73	NS
Within the sample	27	16861.59	627.5032			
Total	31					

Calving interval (CI)

	450 days	Above450 days	360 Days	390 Days	420 Days
Treatment	D	E	A	B	C
Mean (BFY)	112.3	101.0	87.1	84.6	77.9

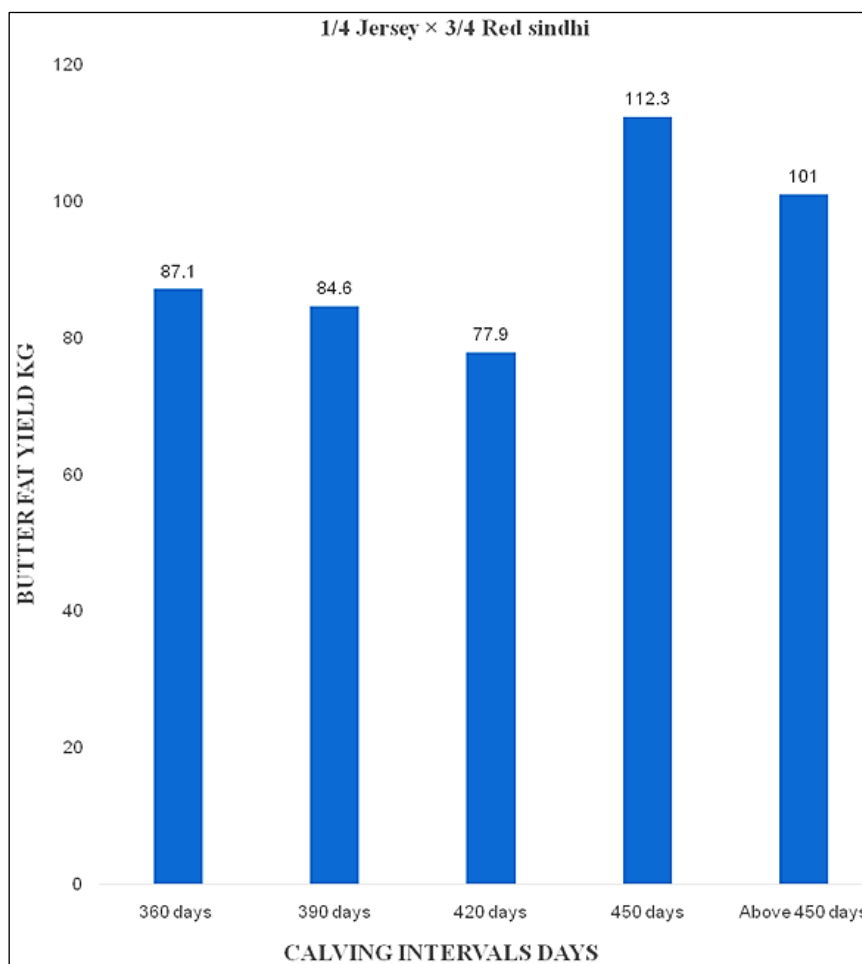


Fig 4: Butter Fat yield (kg) of 1/4 Jersey × 3/4Red Sindhi (kg) crossbred cows as influenced by different calving intervals

Summary

Effect of calving intervals on dry period (days)

The data regarding on dry period (days) of 1/8 Jersey × 7/8 Red Sindhi crossbred cattle as influenced by different calving intervals are presented in Table 4.17 and ANOVA of the same is given in Table 4.18. The following observations were made:

1. Irrespective of calving intervals the dry period of 1/8 Jersey × 7/8 Red Sindhi crossbred cattle ranged from 26 to 72.Days.
2. The dry period in 1/8 Jersey × 7/8 Red Sindhi crossbred cattle pertaining to calving intervals 360 days, 390 days, 420 days, 450 days and above 450 days ranged from 45 to 68 days, 26 to 68 days, 64 to 69 days, 45 to 68 days and 48 to 72 days respectively.
3. The mean dry period of 1/8 Jersey × 7/8 Red Sindhi crossbred cattle pertaining to 360 days, 390 days, 420 days, 450 days and above 450 days was 56.2, 53.8, 67.0, 60.8, 62 days respective. Similarly, this research found in
4. The differences in the dry period of 1/8 Jersey × 7/8 Red Sindhi crossbred cattle between calving intervals groups were Non-significant (Table 4.18).

For the perusal of data on dry period of 1/8 Jersey × 7/8 Red Sindhi crossbred cattle contained in Table 4.17 and Fig. 9 it was evident that dry period of 1/8 Jersey × 7/8 Red Sindhi crossbred cattle in general ranged from 26 to 72 days. The shortest mean dry period (53.8 days) was observed in cow having calving intervals of 360 days followed by 56.2 in cow

of calving intervals ranging from 390 days 53.8 days in cow having calving intervals 420 days and 67.0 days and 450 days 60.8 in cow pertaining to justification period more than 450 days 62.6 The differences in of dry period due to calving intervals were found Non-significant indicating thereby a Non-significant effect of calving intervals on dry period of 1/8 Jersey × 7/8 Red Sindhi crossbred cattle.

Effect of calving intervals on dry period (days)

The data regarding on dry period (days) of 1/4 Jersey × 3/4 Red Sindhi crossbred cattle as influenced by different calving intervals are presented in Table 4.19 and ANOVA of the same is given in Table 4.20. The following observations were made:

1. Irrespective of calving intervals the dry period of 1/4 Jersey × 3/4 Red Sindhi crossbred cattle ranged from 21.0 to 200.0. Days.
2. The dry period in 1/4 Jersey × 3/4 Red Sindhi crossbred cattle pertaining to calving intervals 360 days, 390 days, 420 days, 450 days and above 450 days ranged from 21.0to 68.0 days, 21.0 to 83. Days, 56.0 to 95.0 days, 58.0 to 69.0days and 47.0 to 200.0days respectively.
3. The mean dry period of 1/4 Jersey × 3/4 Red Sindhi crossbred cattle pertaining to 360 days, 390 days, 420 days, 450 days and above 450 days was 39.7, 55.2, 78.3, 64.0, 90.3 days respective.
4. The differences in the dry period of 1/4 Jersey × 3/4 Red Sindhi crossbred cattle between calving intervals groups were Non significant (Table 4.19).

For the perusal of data on dry period of 1/4 Jersey × 3/4 Red Sindhi crossbred cattle contained in Table 4.19 and Fig. 10 it was evident that dry period of 1/4 Jersey × 3/4 Red Sindhi crossbred cattle in general ranged from 21 to 200 days. The shortest mean dry period (21 days) was observed in cow having calving intervals of 360 days followed by 39.7 in cow of calving intervals ranging from 390 days 55.2 days in cow having calving intervals 420 days and 78.3 days and 450 days 64.0 in cow pertaining to justification period more than 450 days 90.3 The differences in of dry period due to calving intervals were found No significant indicating thereby a Non-significant effect of calving intervals on dry period of 1/4 Jersey × 3/4 Red Sindhi crossbred cattle Similarly, this research found in Rai *et al.* (2016)^[1]. The data on dry period (DP) were recorded from history' sheets of 103 Jersey Sindhi crosses. Jersey Sindhi crosses were divided into 4 genetic-groups consisting of 17, 11, 51 and 24 animals in G 1 (1/2J x 1/2RS), G 2 (3/8 J x 5/8 RS), G 3 (1/4 J x 3/4RS), G 4 (1/8J x 7/8 RS).

Effect of calving intervals on butter fat yield (BFY)

The data regarding butter fat yield (kg) of 1/8 Jersey × 7/8 Red Sindhi crossbred cows as influenced by different calving intervals are presented in Table 4.25 and ANOVA for same is given in Table 4.26. The following observations were made:

1. In general, on the butter fat yield of 1/8 Jersey × 7/8 Red Sindhi cross bred cows range from 60 to 142.27 kg
2. The butter fat yield in 1/8 Jersey × 7/8 Red Sindhi crossbred cows pertaining (360 days), (390 days), (420 days), (450 days) and (Above 450 days) ranged from 60 to 82.3, 67.36 to 99, 68.1 to 106.54, 64 to 111.68, 64.63 to 142.27 kg, respectively.
3. The mean butter fat yield (kg) of 1/8 Jersey × 7/8 Red Sindhi crossbred cows of 360 days, 390 days, 420 days, 450 days and above 450 days was 70.81, 80.62, 82.88, 81.64 and 109.9 kg respectively.
4. The differences in the butter fat yield (BFY) of 1/8 Jersey × 7/8 Red Sindhi crossbred cows due to different calving intervals were significant (Table 4.26).

From the perusal of data on BFY 1/8 Jersey × 7/8 Red Sindhi crossbred cows furnished in Table 4.25 and Fig. 13 it was noted that the irrespective of calving intervals the BFY ranged from 60 to 142.27 kg. Nevertheless, the BFY was recorded in cows of 360 days, Followed by (70.81kg) of cows of 390 days (80.62kg) of cows of 420 days, (82.88kg) of cows 450days and (81.64 kg) above 450 days (109.9). Science the differences in the butter fat yield due to calving intervals of cows were found non-significant it indicated non-significant effect of calving intervals on butter fat yield of cows.

Effect of calving intervals on butter fat yield (BFY)

The data regarding butter fat yield (kg) of 1/4 Jersey × 3/4 Red Sindhi crossbred cows as influenced by different calving intervals are presented in Table 4.27 and ANOVA for same is given in Table 4.28. The following observations were made:

1. In general, on the butter fat yield of 1/4 Jersey × 3/4 Red Sindhi cross bred cows range from 57.00 to 152.2 kg.
2. The butter fat yield in 1/4 Jersey × 3/4 Red Sindhi crossbred cows pertaining (360 days), (390 days), (420 days), (450 days) and (Above 450 days) ranged from 62.1 to 101.00, 61.6 to 117.1, 59.1 to 89.7, 95.9 to 128.8, 61 to

152.2 kg, respectively.

3. The mean butter fat yield (kg) of 1/4 Jersey × 3/4 Red Sindhi crossbred cows of 360 days, 390 days, 420 days, 450 days and above 450 days, was 87.1, 84.6, 77.9, 112.3 And 101.0 kg respectively.
4. The differences in the butter fat yield (BFY) of 1/4 Jersey × 3/4 Red Sindhi crossbred cows due to different calving intervals were non-significant (Tab 4.28).

From the perusal of data on BFY 1/4 Jersey × 3/4 Red Sindhi crossbred cows furnished in Table 4.27 and Fig. 14 it was noted that the irrespective of calving intervals the BFY ranged from 57.00 to 152.2 kg. Nevertheless, the BFY was recorded in cows of 360 days, Followed by (87.1kg) of cows of 390 days (84.6 kg) of cows of 420 days, (77.9 kg) of cows 450days (112.3 kg) and above 450 days (101.0kg). Science the differences in the butter fat yield due to calving intervals of cows were found No significant it indicated non-significant effect of calving intervals on butter fat yield of cows.

Conclusion

Above-450 days calving intervals has recorded highest BFY in 1/8 J × 7/8 R S.

Animals of 1/8 J × 7/8 R S and 1/4 J × 3/4 R S crosses can be selected to have highest lactation milk yield and butter fat yield.

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