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## Genetic studies on calving interval and its influence on complete lactation milk and 305 days lactation milk crossbred cattle

**Sushant Shrimant Waghmare, Dr. Ram Pal Singh, Dr. Neeraj Ahlawat, Dr. Ramesh Panday and Anuj Kumar Shukla**

### Abstract

India is a country of diversified agro climatic condition. Agriculture and livestock are the main occupation of over three fourth of the citizens. 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 Milk production is considered to be one of the most important economic traits in selection of dairy cows. Causes of variation in milk yield may be due to genetic, environmental and management factors. Calving interval refers to the period between the birth of a calf and the birth of the next calf. The duration of calving interval ranges from 360-450 days with an average of 405 days in cattle. The first lactation milk yield (kg) of 1/8 Jersey × 7/8 Red Sindhi crossbred cattle ranged from 1314.77 to 3217.59 Kg. The differences in the complete lactation milk yield of cows due to calving interval group were significant. The first lactation milk yield (kg) of 1/4 Jersey × 3/4 Red Sindhi crossbred cattle ranged from 1060.55 to 3375.1 Kg. The differences in the complete lactation milk yield of cows due to calving intervals group were non-significant. Calving interval has a great influence on complete lactation milk yield, 305 lactation milk yields. The 305days lactation milk yield (kg) of 1/8 Jersey × 7/8 Red Sindhi crossbred cattle ranged from 810.32 to 2089.05 Kg. The differences in the 305 days lactation milk yield of cows due to calving interval group were significant. The 305days lactation milk yield (kg) of 1/4 Jersey × 3/4 Red Sindhi crossbred cattle ranged from 914.67 to 2247.48 Kg. The differences in the 305 days lactation milk yield of cows due to Calving interval group were significant. It was concluded that the Calving interval 390-450 days has the highest complete lactation milk yield, 305 lactation milk yield. 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.

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

### Introduction

It plays an important and vital role providing nutritive food, rich in animal protein to general public and supplementing family income and generating gainful employment in the rural sector, particularly among the landless, small marginal farmer and women. Distribution of livestock wealth in India is more egalitarian, compare to land. Hence, from the equity and livelihood perspective, it is considered An important components in poverty alleviation program according to 2021 data the country has 536 Million livestock population and 851.81 Million poultry population having the second highest number of Buffalo 99 million the third highest number of sheep 74 million the second highest number of goods 148 million the sixth highest number of Camels 732 the highest number of chickens 557 Million and the third highest number of duck 45 million in the world now India's rank first in milk production in the world (100.0mt) and milk output accounts for 5.9% of GBP in India.

### 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 complete lactation milk yield. And the effect of Calving Interval on subsequent 305 days Lactation milk yield.

The results obtained are being presented and discussed in this chapter:

**Table 1:** Complete lactation milk yield of 1/8 Jersey × 7/8 Red Sindhi (kg) crossbred cows as influenced by different calving intervals. (Calving interval wise complete lactation milk yield (kg))

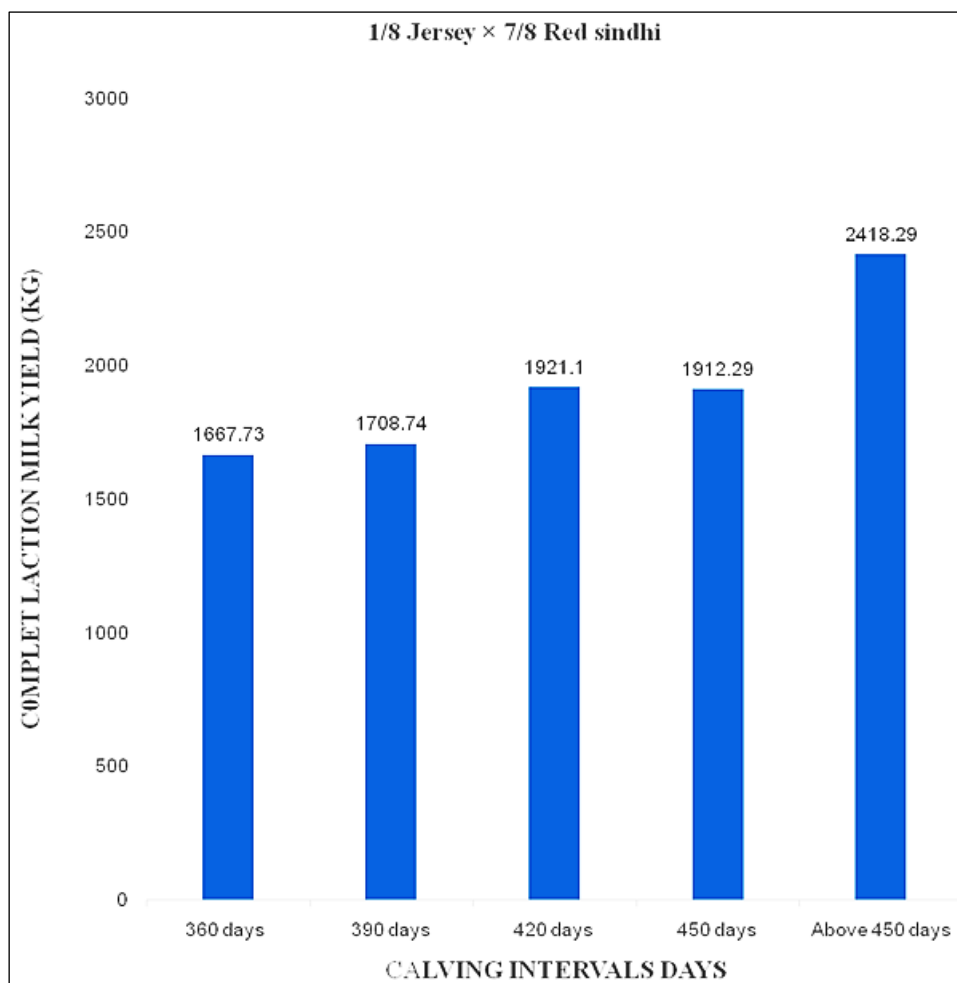
Sr. No.	360 days	390 days	420 days	450 days	Above 450 days
1.	1400.54	1529.5	2105.5	1859.18	2269.56
2.	1979.63	1719.45	2110.1	2218.84	2553.59
3.	1776.49	2226.04	1547.7	1312.12	3217.59
4.	1707.45	1597.4		2259.02	2335.95
5.	1474.54	1644.9			3021.54
6.		1535.2			2212.09
7.					1317.77
Mean	1667.73	1708.74	1921.10	1912.29	2418.29

**Table 2:** ANOVA for the data on complete lactation milk yield (kg) of 1/8 Jersey × 7/8 Red Sindhi (kg) contain

Source of Variation	D.F	S. S	M.S. S	F value		Result	CD 5%
				F-cal	5% Tab		
Between the Sample	4	22868229	571707.23	3.113789	2.87	S	259.58
Within the Sample	20	3672100	183604.99				
Total	24						

**Table 3:** Calving interval

Mean (CLMY)	Above 450 days	420 days	450 days	390 days	360 days
<b>Treatment</b>	<b>E</b>	<b>C</b>	<b>D</b>	<b>B</b>	<b>A</b>
	2418.29	1921.10	1912.29	1708.74	1667.73



**Fig 1:** Complete lactation milk yield of 1/8 Jersey × 7/8 Red Sindhi (kg) crossbred cows as influenced by different calving intervals

**Table 4:** Complete lactation milk yield of 1/4 Jersey × 3/4 Red Sindhi (kg) crossbred cows as influenced by different calving intervals

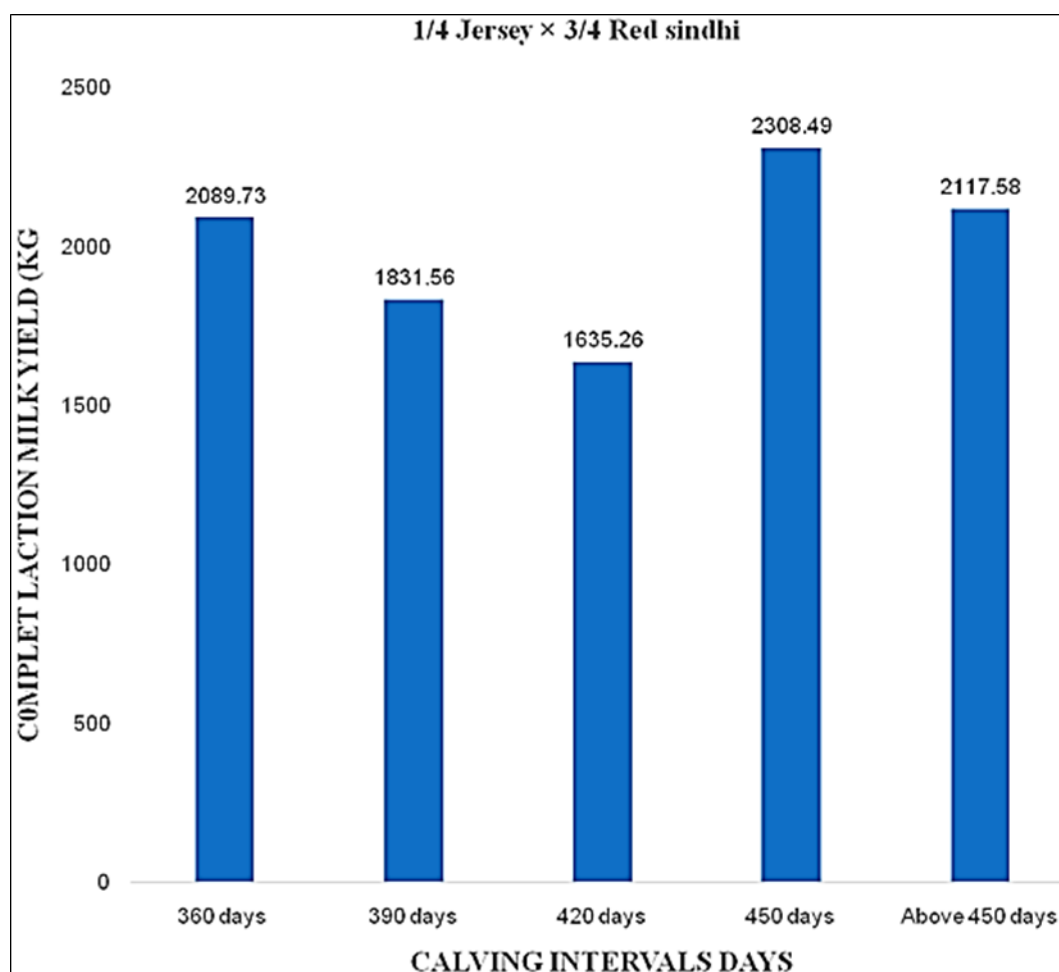
Sr. No.	360 days	390 days	420 days	450 days	Above 450 days
1.	2019.12	2404	1692.13	2039.81	2264.1
2.	2189.9	1527.68	1185.12	2262.22	1426.36
3.	2060.18	2182.18	1675.66	2317.77	2041.45
4.		2164.13	1988.13	2614.18	3222.77
5.		2525.05			1760.63
6.		1211.13			2783.9
7.		1060.55			3375.1
8.		2316.82			2149.09
9.		1407.72			1265.54
10.		1516.36			1453.13
11.					1551.41
Mean	2089.73	1831.56	1635.26	2308.49	2117.58

**Table 5:** ANOVA for the data on complete lactation milk yield (kg) of 1/4 Jersey × 3/4 Red Sindhi (kg) contain

Source of Variation	D.F	S. S	M.S. S	F value		Result
				F-cal	5% Tab	
Between the Sample	4	1369031	342257.71	1.08432	2.73	NS
Within the Sample	27	8522356	315642.8			
Total	31					

**Table 6:** Calving interval (CI)

	450 Days	Above 450 Days	360 Days	390 Days	420 Days
Treatment	D	E	A	B	C
Mean (CLMY)	2308.495	2117.589	2089.733	1831.562	1635.26



**Fig 2:** Complete lactation milk yield of 1/4 Jersey × 3/4 Red Sindhi (kg) crossbred cows as influenced by different calving intervals

**Table 7:** 305 days lactation milk yield of 1/8 Jersey × 7/8 Red Sindhi (kg) crossbred cows as influenced by different calving interval Calving interval wise from 305 days lactation milk yield (kg)

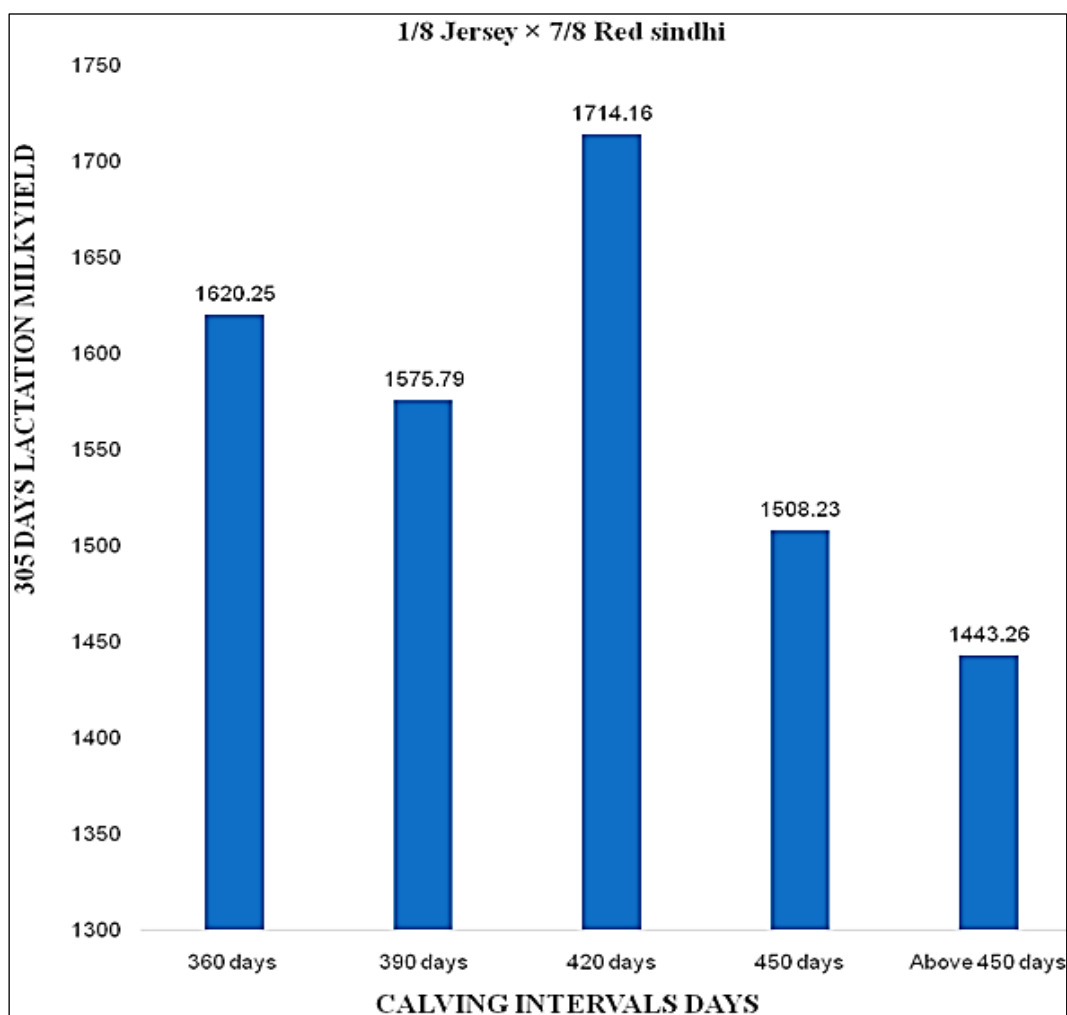
Sr. No.	360 days	390 days	420 days	450 days	Above 450 Days
1.	1377.95	1422.24	1803.86	1524.32	1395.59
2.	1916.78	1628.67	1950.24	1538.06	1560.81
3.	1747.83	2089.05	1388.37	1013.15	1943.29
4.	1653.24	1494.5		1957.38	1604.65
5.	1405.42	1401.38			1732.27
6.		1418.89			1055.84
7.					810.32
Mean	1620.25	1575.79	1714.16	1508.23	1443.26

**Table 8:** ANOVA for the data on 305 days lactation milk yield (kg) 1/8 Jersey × 7/8 Red Sindhi (kg) contain

Source of Variation	D.F	S. S	M.S. S	F. value		Result
				F-cal	5% Tab	
Between the sample	4	195965.1	48991.2706	0.463542	2.87	NS
Within the sample	20	2113781	105689.052			
Total	24					

**Table 9:** Calving interval (CI)

	420 Days	360 days	390 Days	450 Days	Above 450 Days
Treatment	C	A	B	D	E
Mean 305 (LMY)	1714.157	1620.244	1575.788	1508.228	1443.253



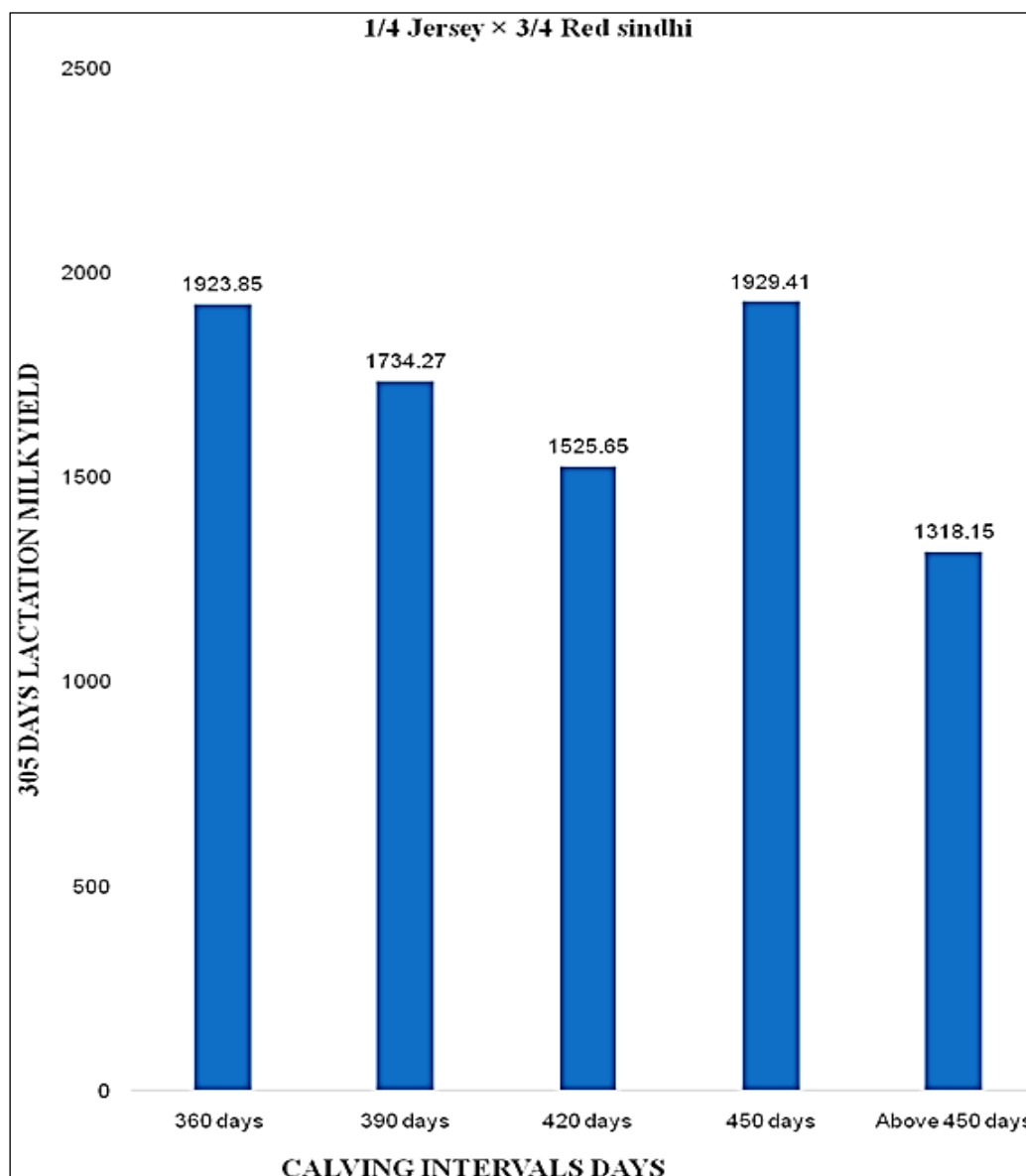
**Fig 3:** 305 days lactation milk yield of 1/8 Jersey × 7/8 Red Sindhi (kg) crossbred cows as influenced by different calving interval

**Table 10:** 305 days lactation milk yield of 1/4 Jersey ×3/4 Red Sindhi (kg) crossbred cows as influenced by different calving interval Calving interval wise from 305-day lactation milk yield (kg)

Sr. No.	360 days	390 days	420 days	450 days	Above 450 Days
1.	1854.91	2208.49	1563.94	1579.04	1228.74
2.	2024.00	1507.90	1126.05	2247.48	964.61
3.	1892.64	2054.21	1597.11	1836.16	1500.34
4.		2129.22	1815.51	2054.96	1912.34
5.		2187.90			978.13
6.		1191.60			1747.10
7.		1001.45			1456.02
8.		2243.27			1229.78
9.		1317.04			914.67
10.		1501.59			1385.01
11.					1182.95
Mean	1923.85	1734.27	1525.65	1929.41	1318.15

**Table 11:** ANOVA for the data on 305 days lactation milk yield (kg) 1/4Jersey ×3/4 Red Sindhi (kg) contain

Source of Variation	D.F	S. S	M.S. S	F. value		Result	CD 5%
				F-cal	5% Tab		
Between the Sample	4	65381371	16345342.7	122.1445	2.73	S	240.71
Within the Sample	27	3613133	133819.739				
Total	31						



**Fig 4:** 305 days lactation milk yield of 1/4 Jersey ×3/4 Red Sindhi (kg) crossbred cows as influenced by different calving interval

**Table 12:** Calving interval (CI)

Mean (305 LMY)	450 days	360 days	390 days	420 days	Above 450 Days
Treatment	D	A	B	C	E
	1929.41	1923.85	1734.267	1525.65	1318.15

### Summary

#### Effect of calving interval on subsequent complete lactation milk yield (CLMY)

The data regarding on complete lactation milk yield (kg) of 1/8 Jersey × 7/8 Red Sindhi crossbred cattle as influenced by different calving interval are presented in Table 1 and ANOVA of the same is given in Table 2. The following observations were made:

1. In general the complete lactation milk yield (kg) of 1/8 Jersey × 7/8 Red Sindhi crossbred cattle ranged from 1314.77 to 3217.59 Kg.
2. The Complete lactation milk yield (kg) of 1/8 Jersey × 7/8 Red Sindhi crossbred cattle pertaining to their calving interval of 360 Days, 390 days, 420 days, 450 days and (Above) 450 days ranged from 1400.54 to 1979.63, 1529.5 to 2226.04, 1547.7 to 2110.1, 1312.12 to 2259.02 and 1317.77 to 3217.59 kg respectively.
3. The mean Complete lactation milk yield (kg) of 1/8 Jersey × 7/8 Red Sindhi crossbred cattle Pertaining to 360 Days, 390 days, 420 days, 450 days and (Above) 450 days kg 1667.73, 1708.74, 1921.10, 1912.29 And 2418.29 respectively. Similarly, this research found in Acharya *et al.*, (1998) <sup>[1]</sup> reported least square means for first lactation in red sindhi and its crosses with jersey
4. The differences in the complete lactation milk yield of cows due to calving interval groups were significant (Table 3)

From the perusal of data on complete lactation milk yield of crossbred 1/8 Jersey × 7/8 Red Sindhi cattle furnished in Table 1 and Fig 1 indicated that highest mean complete lactation milk yield (2418.29) was observed in cow having calving interval 360 days followed by 1667.73 kg in cow with calving interval of 390 days, 1708.74kg in cows having, calving interval ranging from 420 days 1921.10 kg, 450 days 1912.29 of calving intervals above 450 days 2418.29. The differences in complete lactation milk yield due to calving intervals were found significant indicating thereby a significant effect of calving intervals on complete lactation milk yield.

#### Effect of calving interval on subsequent complete lactation milk yield (CLMY)

The data regarding on complete lactation milk yield (kg) of 1/4 Jersey × 3/4 Red Sindhi crossbred cattle as influenced by different calving interval are presented in Table 4 and ANOVA of the same is given in Table 4. The following observations were made:

1. In general the first lactation milk yield (kg) of 1/4 Jersey × 3/4 Red Sindhi crossbred cattle ranged from 1060.55 to 3375.1Kg.
2. The Complete lactation milk yield (kg) of 1/4 Jersey × 3/4 Red Sindhi crossbred cattle pertaining to their calving interval of 360 Days, 390 days, 420 days, 450 days and (Above) 450 days ranged from 2019.12 to 2189.9, 1060.55 to 2525.05, 1185.12 to 1988.13, 2039.81 to 2614.18, 1426.36 to 3375.1 kg respectively.
3. The mean complete lactation milk yield (kg) of 1/4 Jersey

× 3/4 Red Sindhi crossbred cattle. Pertaining to 360 Days, 390 days, 420 days, 450 days and (Above) 450 days kg 2089.73, 1831.56, 1635.26, 2308.49 and 2117.58 respectively.

4. The differences in the complete lactation milk yield of cows due to calving intervals groups were non-significant (Table 4)

From the perusal of data on complete lactation milk yield of crossbred 1/4 Jersey × 3/4 Red Sindhi cattle furnished in Table 3 and Fig 2 indicated that highest mean complete lactation milk yield 2308.49 was observed in cow having calving intervals 360 days followed by 2089.73kg in cow with calving interval of 390 days, 1831.56 kg in cows having, calving interval ranging from 420 days 1635.26 kg, 450 days 2308.49 of calving intervals above 450 days 2117.58. The differences in complete lactation milk yield due to calving intervals were found significant indicating thereby a significant effect of calving intervals on complete lactation milk yield.

#### Effect of calving interval on subsequent 305 days lactation milk yield (305 LMY)

The data regarding on 305 days lactation milk yield (kg) of 1/8 Jersey × 7/8 Red Sindhi crossbred cattle as influenced by different calving interval are presented in Table 9 and ANOVA of the same is given in Table 10. The following observations were made:

1. In general the 305days lactation milk yield (kg) of 1/8 Jersey × 7/8 Red Sindhi crossbred cattle ranged from 810.32 to 2089.05 Kg.
2. The 305 days lactation milk yield (kg) of 1/8 Jersey × 7/8 Red Sindhi crossbred cattle pertaining to their calving interval of 360 Days, 390 days, 420 days, 450 days and (Above) 450 days ranged from 1377.95 to 1916.78, 1401.38 to 2089.05, 1388.37 to 1950.24, 1013.15 to 1957.38, 810.32 to 1943.29 kg respectively.
3. The mean 305 days lactation milk yield (kg) of 1/8 Jersey × 7/8 Red Sindhi crossbred cattle Pertaining to 360 Days, 390 days, 420 days, 450 days and (Above) 450 days kg 1620.25, 1575.79, 1714.16, 1508.23, 1443.26 respectively.
4. The differences in the 305 days lactation milk yield of cows due to calving interval groups were significant (Table 10)

From the perusal of data on 305 days lactation milk yield of crossbred 1/8 Jersey × 7/8 Red Sindhi cattle furnished in Table 9 and Fig. 5 indicated that highest mean 305 days lactation milk yield (1714.16) was observed in cow having calving intervals 360 days followed by 1620.25 kg in cow with calving interval of 390 days, 1575.79 kg in cows having, calving interval ranging from 420 days 1714.16 kg, 450 days 1508.23 of calving intervals above 450 days 1443.26. The differences in 305 lactation milk yield due to calving intervals were found non-significant indicating thereby a non-significant effect of calving intervals on 305 days lactation milk yield.

### Effect of calving interval on subsequent 305 days lactation milk yield (305 LMY)

The data regarding on 305 days lactation milk yield (kg) of 1/4 Jersey × 3/4 Red Sindhi crossbred cattle as influenced by different calving interval are presented in Table 11 and ANOVA of the same is given in Table 12. The following observations were made:

1. In general the 305 days lactation milk yield (kg) of 1/4 Jersey × 3/4 Red Sindhi crossbred cattle ranged from 914.67 to 2247.48 Kg.
2. The 305 days lactation milk yield (kg) of 1/4 Jersey × 3/4 Red Sindhi crossbred cattle pertaining to their calving interval of 360 Days, 390 days, 420 days, 450 days and (Above) 450 days ranged from 1892.64 to 2024.00, 1001.45 to 2243.27, 1126.05 to 1815.51, 1579.0 to 2247.48, 914.67 to 1912.34 kg respectively.
3. The mean 305 days lactation milk yield (kg) of 1/4 Jersey × 3/4 Red Sindhi crossbred cattle Pertaining to 360 Days, 390 days, 420 days, 450 days and (above) 450 days kg 1923.85, 1734.27, 1525.65, 1929.41, 1318.15 respectively.
4. The differences in the 305 days lactation milk yield of cows due to calving interval groups were significant (Table 12)

From the perusal of data on 305 days lactation milk yield of crossbred 1/4 Jersey × 3/4 Red Sindhi cattle furnished in Table 11 and Fig. 6 indicated that highest mean 305 days lactation milk yield (1929.41) was observed in cow having calving intervals 360 days followed by 1923.85 in cow with calving interval of 390 days, 1734.27 kg in cows having, calving interval ranging from 420 days 1525.65 kg, 450 days 1929.41 of calving intervals above 450 days 1318.15. The differences in 305 lactation milk yield due to calving intervals were found significant indicating thereby a significant effect of calving intervals on 305days lactation milk yield.

### Conclusion

420-Above 450 days calving intervals has recorded highest complete lactation milk yield in 1/8 J × 7/8 R S crosses.

450 days calving intervals has recorded highest 305 days lactation milk yield in 1/4 J × 3/4 R S crosses.

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.

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