

PRODUCTIVE PERFORMANCE OF HOLSTEIN-FRIESIAN CATTLE IN NORTH WEST FRONTIER PROVINCE (NWFP) OF PAKISTAN

Rahmat Jan Afridi
Veterinary Research Institute, Peshawar, Pakistan

ABSTRACT

A study was carried out to analyze the productive performance of Holstein-Friesian cattle herd in NWFP. Data on 577 lactation records of 57 imported and 75 local-born cows were analyzed. The overall average milk yield and lactation length was 3002.66 ± 45.49 liters and 315.09 ± 17.75 days, respectively. Milk yield was the highest (3320.20 liters) in autumn calvers while lactation length was maximum (340.28 days) in summer calvers. The effect of calving seasons on milk yield and lactation length was significant ($P < 0.01$).

INTRODUCTION

Agriculture is one of the most important sectors of the national economy of Pakistan contributing about 26% to the gross domestic product (GDP), 55% of employment and up to 70% of export earnings. Crops alone provide about 69% and livestock 30% of the value of agriculture production, the remaining 1% being from fisheries and forestry (Ahmad, 1994).

In spite of presence of millions heads of cattle, buffaloes, sheep and goats in N.W.F.P. which are producing sufficient amount of milk, this province is still deficient in milk and utilizes the imported dry milk powder to face the demand of the people. In order to overcome the deficiency of milk in the province, a high yielding strain of Holstein Friesian dairy breed of cattle was imported from Netherlands by N.W.F.P. Government, but there are several factors, physiological and environmental, which have direct influence on animal performance. The present study, therefore, has been planned to assess the productive performance of imported as well as local born Holstein Friesian cows, kept at Government Cattle Breeding and Dairy Farm, Harichand, Charsadda, N.W.F.P.

MATERIALS AND METHODS

This study was conducted on 132 Holstein-Friesian cows including local born (75) and imported (57) from the Netherlands. The animals were kept at Government Cattle Breeding and Dairy Farm Harichand, Charsadda, N.W.F.P. The data were collected on lactation milk yield, lactation length and calving season. The months of the year were grouped in four seasons as under:

- A Winter: November to January.
- B Spring : February to April.
- C Summer: May to July.
- D Autumn: August to October

The arithmetic mean with standard error (\pm) was calculated for the parameters studied. Analysis of variance and Duncan's multiple range test was also applied to test the significant differences among the mean values. The standard statistical methods as suggested by Gomez and Gomez (1984) were applied.

RESULTS AND DISCUSSION

The mean values for milk yield and lactation length are shown in Table 1.

Table 1: Milk yield and Lactation length of Holstein-Friesian cattle kept at CB and DF Harichand.

Parameters	Imported			Farm Born		
	Mean	S.E	Range	Mean	S.E	Range
Milk Yield (Liters)	3771.74	59.00	1398.30-8278.90	3081.88	55.51	1060.10-8278.90
Lactation length (days)	331.51	18.21	109.00- 759.00	298.66	17.28	102.00-553.00

No. of imported cows = 57; No. of farm born cows = 75 ; Total number of cows = 132

Milk yield

The data regarding milk yield (Table 1, 2) showed that average milk yield of imported cows was 3771.74 ± 59.00 liters and local-born Holstein-Friesian cows was 3081.88 ± 55.51 liters. The overall average milk yield was 3002.66 ± 45.49 liters and the overall co-efficient of variation for milk yield was 25.11 percent. The milk yield showed an increasing trend from first to fourth lactation. The milk yield in the 1st and 2nd lactations averaged 3278.86 and 3340.62 liters, respectively. The maximum milk yield was obtained in the fourth lactation (3870.34 liters). The analysis of variance showed significant difference in milk yield over lactation number (Table 2).

Table 2: Means of milk yield in Holstein-Friesian herd in different lactations

Lactation Number	No. of Observation	Milk yield (liters)	± S.E.
1	132	3278.86 c	78.50
2	132	3340.62 bc	73.15
3	132	3587.66 b	74.65
4	78	3870.34 a	81.13
5	44	3466.08 a	73.75
6	28	2734.64 d	47.40
7	17	3299.18 c	56.19
8	06	3089.58 c	86.50
9	02	3578.75 b	92.40

Mean values having different superscripts in a column differ significantly ($P < 0.01$).

The results of the present study are substantiated by the findings of different workers who reported that milk yield in Holstein-Friesian cows ranges from 3610 to 3778 kg (Ribas *et al.*, 1978; Guerra and Menendez, 1983). The milk yield in the herd under study was higher than the average milk yield of Holstein-Friesian breed under tropical and sub-tropical climates as reported by Oliveira (1975), Salazar and Huertas (1976), Cetegen (1978), Arora and Sharma (1983), Osman and Kassim (1983). Those workers reported that milk yield in Holstein-Friesian cows averaged 2454, 2543, 2808, 2546 and 1916 kg in Brazil, Colombia, Turkey, India and Malaysia, respectively. Some researchers have, however, reported higher milk yield in Holstein-Friesian cows in tropical and subtropical countries like Romania, India, Pakistan and Chile (Alexoiu and Calinesch 1978; Sandana and Basu, 1981;

Cheema, 1985; Perez *et al.*, 1985). The milk yield as reported by above researchers ranged from 3911 to 5229 kg which is much higher than recorded in the present study.

Lactation length

The lactation length in the imported Holstein-Friesian cow averaged 331.51 ± 18.21 days while in the local-born Holstein-Friesian it was 298.66 ± 17.28 days. The overall average lactation length was 315.09 ± 17.75 days and the overall co-efficient of variation for lactation length was 12.50 percent (Tables 1, 3). The longest lactation length was found in fourth lactation (388 days), followed by 3rd (365) and 2nd (320 days) lactations while the shortest lactation length was found at 6th lactation (278 days). The differences in the lactation length were highly significant ($P < 0.01$).

Table 3: Means of lactation length (days) in Holstein-Friesian herd

Lactation No.	No. of observations	Lactation length (days)
1	132	311 ^b
2	132	320 ^a
3	132	365 ^a
4	78	388 ^a
5	44	310 ^b
6	28	260 ^c
7	17	310 ^b
8	6	278 ^{bc}
9	2	288 ^{bc}

Mean values having different superscripts in a column differ significantly ($P < 0.01$).

The lactation length found in the present study was in conformity with the findings of Roman *et al.* (1976), Bodisco *et al.* (1977), Arora and Sharma (1983), and Perez *et al.* (1985). They reported that lactation length in Holstein-Friesian cattle herd ranged from 320 to 329 days. Oliveira (1975) reported that the lactation length in Holstein-Friesian cows in Brazil averaged 392 days. Similarly Fulsouder *et al.* (1985) reported a lactation length of 370 days. The findings of these authors are not in accordance with those of the present study, where the overall lactation length averaged 315.09 days. Several workers have reported the lactation length of shorter duration than the average lactation length found in the

present study (Herrera, 1977; Rodriguez *et al.*, 1976; Cetegen, 1978). The lactation length as reported by those authors ranged from 279 to 305 days in Holstein-Friesian cattle, kept in various tropical and subtropical countries. The difference could be attributed to different climatic and managerial aspects.

The data on the seasonality of calving (Table 4) indicated that on overall basis, maximum (50.08%) cows calved during winter, followed by 29.98% cows calved in Autumn season. However, the calving being the lowest (2.25%) in summer (Table 4). These findings were in accordance with those of Cheema (1985) who found that 29 and 28 percent of calving occurred during autumn and winter season, respectively. Similarly Kumar *et al.* (1980) also have the same opinion for calving season in Holstein-Friesian cows in India. The influence of season of calving on the animals performance is well recognized.

Effect of season of calving on milk yield and lactation length

The mean (milk yield) in various season of the year is shown in (Table 5). The data suggested that maximum milk yield (3320.3 liters) was recorded in autumn calvers, followed by spring calvers (3215.0 liters), while the summer calvers yielded lowest milk (2600.0 liters).

The present results were not in agreement with the findings of Ribas *et al.* (1978) and Oliveira (1975) who reported that season had no effect on milk yield in Holstein-Friesian cows in Cuba and Brazil, respectively.

However, the results of the present study were in agreement with those of many workers who found significant effect of season of calving on milk yield (McDowell *et al.*, 1976; Arora and Sherma, 1983; Blake and Custodia, 1984; Nobre *et al.*, 1984; Suk *et al.*, 1984; Pytloun *et al.*, 1986). Pytloun *et al.* (1986) analyzed the data of Friesian cattle and reported that 305 days milk yield was significantly influenced by season of calving.

The effect of season on milk yield was attributed to high temperature and humidity during the summer season. This is apparent from the low yield of milk (2600.0 liters) in summer season in the present herd. The increase in milk yield during autumn, winter and spring season may partly be attributed to lower temperature and partly due to availability of ample green fodder (leguminous) during winter/spring.

Table 5 revealed that the lactation length was maximum (340.3 days) in the summer calvers and it was minimum (265.9 days) in winter calvers. The lactation length averaged to 325.2 and 330.2 days in autumn and spring calvers, respectively. The analysis of variance reveals a highly significant ($P < 0.01$) effect of season on lactation length.

The present results were in conformity with the findings of following workers, who reported that the lactation length significantly affected by season of calving (Nobre *et al.*, 1984; Rako and Karadjole, 1984; Duc and Taneja, 1984).

The present results were not in accordance with the findings of workers (Oliveira, 1975; Herrera, 1977; Ribas *et al.*, 1978; Janicki, 1982; Arora and Sharma, 1983) who reported that the lactation length was not affected by season of calving.

Table 4: Frequency of calving in different seasons in Holstein-Friesian herd

Season	Imported		Farm born		Overall	
	No. of observations	Percent	No. of observations	Percent	No. of observations	Percent
Autumn	80	27.03	93	33.09	173	29.98
Winter	154	52.03	135	48.04	289	50.08
Spring	54	18.24	48	17.08	102	17.70
Summer	08	02.7	05	1.80	13	2.25
Total	296	100	281	100	577	100

Table 5: Means values for different traits in various seasons of year in Holstein-Friesian herd

Traits	Autumn	Winter	Spring	Summer
Milk Yield (liters)	3320.3 ^a	2891.0 ^b	3215.0 ^a	2600.0 ^b
Lactation length (days)	325.2 ^a	265.9 ^b	330.2 ^a	340.3 ^a

Values bearing different superscripts in a row differ significantly ($P < 0.05$).

CONCLUSION

The study revealed that the overall performance of imported Holstein-Friesian was better than local born Holstein-Friesian at the farm. Moreover, the milk yield and lactation length was maximum in autumn. It means that season has great influence on these traits. So, synchronization of estrous cycle in breeding season in Holstein-Friesian is suggested according to the favourability of the season for getting more benefits.

REFERENCES

- Ahmad, M., 1994. Livestock sector of NWFP/ ARPII/ OPVC/NESPAC/DA CR 2154-PAK/Univ. Agri. Peshawar, Pakistan.
- Alexoiu, A. and E. Calinesch, 1978. Observation on the milk production of Friesian cows imported from the Netherlands. *Revista de Cresterea Animal-elor.*, 28 (2): 18-22.
- Arora, D.N. and J.S. Sharma, 1983. Factors affecting some of the traits in Holstein- Friesian cattle. *Indian Vet. J.*, 60(10): 820-823.
- Blake, R.W. and A.A. Custodio, 1984. Factors influencing lactation performance of range beef and dairy cows. *Canadian J. Anim. Sci.*, 64(2): 267-277.
- Bodisco, V. A. Rodriguez Voigt, E.C. Alfano and S. Mendoza, 1977. The 1st lactation in three generations of Holstein- Friesian and B. Swiss in Morocco, Venezuela. *Agronomia Tropical*, 27(6): 591-600.
- Cetegen, D., 1978. Milk production of Friesian cows in 1971-75 at Sakarya cattle Breeding Station. *Lolahan Zootechnia Inst. Dergisi*, 18 (3-4): 78-100.
- Cheema, A.A., 1985. Reproductive performance of Holstein-Friesian cows kept at Quetta. M.Sc. thesis. Deptt. Anim. Rerod, Faculty of Vet. Sci. Univ. Agri., Faisalabad, Pakistan.
- Duc, N.V. and V.K. Taneja, 1984. Comparative performance of pure-bred and cross-bred grades in India. *Ind. J. Anim. Sci.*, 45(11): 1023-1028.
- Fulsouder, A.B., K.R. Tajane, N.S. Radadia and A.P. Vyas, 1985. The influence of Holstein-Friesian inheritance on the performance of Kankrij cattle. *Livestock Advisor*, 9(5): 9-12.
- Gomez, K.A. and A.A. Gomez, 1984. Statistical procedure for Agricultural Research 2nd ed. John Welly Lons New York.
- Guerra, D. and A. Menendez, 1983. Effect of service period on partial and total milk yield in Holstein-Friesian cows. *Revista Cubana de Reprod. Anim.* 9(1): 47-57.
- Herrera, G.M.E., 1977. A study on the milk production in a herd of Friesian. 1. Effect of age, Lactation length and calving interval. *Archivos de Zootechnia* 25 (99): 287-297.
- Janicki, C., 1982. Influence of season and age at 1st calving on the milk yield of Holstein-Friesian and Black and white low land cows in the state pedigree herd at Osowa. *Sien. Roczniki Academi Rolmczes W. Poznaia No. 120 Zootechnia* 281, 43-50. (*Dairy. Sci. Abst.*, 44: 1377, 1982).
- Kumar, S.H., S. Panday, N.C. Sharma and B.G. Kapatal, 1980. Productive and reproductive performance of Holstein-Friesian herds in India. *Indian Vet. Med. J.*, 4(1): 1-7.
- McDowell, R. E., N.W. Hooven and J.K. Camoens, 1976. Effect of climate on performance of Holsteins in 1st lactation. *J. Dairy Sci.* 59 (5): 965-973.
- Nobre, P.R.C.J.C, Milagres, M. Silva, M. Dea, and J.A. Garica, 1984. Genetic and environmental factors affecting lactation length in dairy herd at the Fed. Univ. of Viscosa-Minas Gercis state. *Revista de Sociadacle Brasileira de. Zootechnia* 13 (3) 375-384. (*Anim. Breed. Abst.* 53: 4812, 1985).
- Oliveira, F.M.D.E., 1975. Some factors affecting milk production of Holstein-Friesian herd. Thesis Universidade Fedral de Minas Garais, Brazil pp: 39.
- Osman, A. and H. Kassim, 1983. Lactational performance of imported Australian Friesian in Malaysia under zero grazing. *Japanese Society Zoo-technical Sci.*, 881-882. (*Anim. Breed. Abst.*, 53: 5634, 1985).
- Perez, C.C., I.G. Buzlletti, P.N. Barria and M.F. Gonzalez, 1985. Milk yield characters in Holstein-Friesian cows in the Metropolitan region of Chile. 1. Phenotype characters and factors affecting variation. *Ciencia-e-Investigacion Agraria*, 12 (2): 121-128.
- Pytloun, J. J., Bouska, F. Urban and J. Motycka, 1986. The effect of some factors on the performance of cows in the first lactation. *Vyzkumny Ustavzivoc inse Vyroby.*, 31 (1): 37- 46. (*Anim. Breed. Abst.*, 54: 3647, 1986).
- Rako, A. and I. Karadjole, 1984. The effect and importance of calving season on fertility and milk yield. *Stocarstvo*, 38: 123-127 (*Anim. Breed. Abst.*, 53: 93; 1985).

- Ribas, M. R. Ponce, De Leon, and N. Portal, 1978. Preliminary study on the non-genetic factors and co-relation in milk production in Holstein in Cuba. *Cuban. J. Anim. Sci.*, 12(3): 217-224.
- Rodriguez, F. C.J. Wilcox, J. Roman and F. Martin, 1976. Effect of age on milk yield in Holstein-Friesian. *Manoria Association, Lactino-americana de Produc. Anim.* 11: 47. (*Anim. Breed. Abst.*, 46: 1220, 1978).
- Roman, H. E. Cabello and C.J. Wilcox, 1976. Some factors related to milk production in tropical climate. *Manoria, Association Latino-americana de Produc. Anim.* 11: 52. (*Anim. Breed. Abst.*, 46: 1223, 1978).
- Salazar, D. and V.E. Huertas, 1976. Efficiency of milk production in Colombia. *Manoria, Association Latino-americana de Produc. Anim.*, 11: 5. (*Anim. Breed. Abst.*, 46: 1224, 1978).
- Sandana, D.K and S.B, Basu, 1981. Productive performance of exotic breeds in India. *Indian J. Dairy Sci.*, 34(4): 443-47.
- Suk, Y.D., K.H. Chung and H.K. Kim, 1984. Effect of calving factor on milk production traits in dairy cows. *Korean J. Dairy. Sci.*, 6(2): 101-108.