

GENETIC TREND IN MILK YIELD OF EXOTIC CATTLE IN INDIA

D.K.SADANA and V.N.TRIPATHI
Dairy Cattle Genetics Division
N.D.R.I., Karnal 132 001 INDIA

SUMMARY

For the purebred exotic cattle in India the phenotypic and genetic trends were estimated. While the phenotypic trends were positive for all the four farms, the genetic trend was found to be negative for three and positive for one. This necessitates a higher emphasis on progeny testing and sire selection for the improvement of the imported breeds.

INTRODUCTION

Genetic and phenotypic changes in the performance traits of cattle is the ultimate indicator of progress in a herd. Such a change is measured as genetic or phenotypic trend. Different methods have been developed to quantify the phenotypic change and its genetic and environmental components. Smith (1962) developed a method for estimating the genetic change based on the comparison of mean performance of paternal half sisters in different years. The only requirement of this method is that there must be some sort of continuity of genotypes over different years. In the farm conditions, the progenies of sires born in several years provide such a continuity. Genetic trend for milk yield has been estimated for various breeds including Tharparkar, Hariana, Red Sindhi, Kangayam and Kankrej (Narain and Garg, 1972; Gurnani and Nagarcenkar, 1974; Kumar and Narain, 1979). However, there is no report available on genetic trend in Jersey and Holstein Friesian cattle being maintained in India. The estimate would be of use to better assess the stayability and adaptability of these breeds under Indian milieu.

MATERIALS AND METHODS

First lactation milk yield of 268 Holstein Friesian purebreds at Hissar and 499 Jersey purebreds at three farms located at Hissar (Haryana state), Kamand and Palampur (H.P. state) were subject to analysis. The data pertained to the progeny of sires born in several years (Table). On an average, a sire was used for 2-3 years in the farm. The change in milk yield of these paternal half sibs in successive years reflects the environmental plus one half of the genotypic trend. From this the genotypic trend was isolated using the following estimate:

$$G = -2(b(P-P')).T/S$$

The estimate, measured as twice the intrasire (S) regression (b) on time (T) of the progeny performance (P), performance being expressed as deviation from contemporary average (p'), tends to eliminate any effect of year to year fluctuations in the environment and the effect of seasons (Jain 1982).

RESULTS AND DISCUSSION

The least squares mean milk yield in Holstein breed was 3105.29 ± 52.90 kg with 27.89 % CV while in Jersey breed it was 1330.58 ± 26.69 , 1696.81 ± 56.78 and 2089.97 ± 55.80 kg at Kamand, Palampur and Hissar farms respectively, with an overall Jersey average of 1987.45 ± 39.05 kg with 43.85 % CV. In the present study the milk yield of Holstein cows was higher than observed as 1671.0 kg by Singh and Mishra (1980) in Orissa while it was lower than reported by Sadana and Basu (1981) for N.D.R.I. farm as 3522 kg. Similar value as in the present study was reported to be 3078 kg by Ganpuleet *al.* (1984). In Jersey breed, Singh and Mishra (1980) reported a very low value as 1067 kg in Orissa while Rajagopalan and Dave (1976) reported a high value as 3004 kg. Ganpuleet *al.* (1984) reported the yield as 1936 kg in Ranchi.

In the present study the phenotypic improvement in milk yield based on the first lactation was observed in both the breeds and at all the farms (Table). In terms of absolute values, the estimate of phenotypic trend was higher for Holstein breed. For the Jersey breed the gain was highest for the Kamand farm where the lactational milk yield was the least. As a ratio to the herd average, the phenotypic gain was observed to be 10.82 % in Jersey herd at Kamand while for the other two herds of Jersey and the one of Holstein the gain was ranging between 4.05 to 6.88 % (Table).

Regarding the genetic gain, it was striking to note a decreasing trend in both the breeds and at all the farms except for Jersey at Hissar. When the genetic gain as a percentage of herd average was compared for different locations, maximum decrease was observed for Jersey at Palampur (-1.15 %) followed by Holstein at Hissar (-0.64 %) and Jersey at Kamand (-0.40 %). For Jersey at Hissar there was a positive gain as 0.40 %. Negative genetic trends have been reported in India as -6.98 kg for Red Sindhi and -13.15 kg for Kangayam breed (Narain and Garg, 1972), and for Tharparkar breed as -17.50+21.8 kg (Gurnani and Nagarcenkar, 1974) and -26.99 kg (Kumar and Narain, 1979).

Negative genetic trend revealed that the sires used in the later years were of inferior genetic worth to those used in earlier years. It can be inferred that the sires used in the later years did not prove to be superior sires. This may be because of ineffective selection or lack of acclimatization of the animals or both.

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Table: Genetic and phenotypic trends in milk yield.

Breed	H.F		Jersey	
	Hissar	Hissar	Kamand	Palampur
Period of data	1974-81	1975-81	1975-80	1975-81
Number of sires	36	19	18	22
Number of daughters	268	171	113	215
305 Day milk yield:				
Phenotypic trend(kg)	+204.72 (6.68%)	+104.25 (4.05%)	+173.11 (10.82%)	+95.65 (6.11%)
Genetic trend(kg)	-19.57 +17.77 (-0.64%)	+10.36 +25.24 (+0.40%)	-6.38 +12.10 (-0.40%)	-18.00 +24.50 (-1.15%)

Figures in parentheses indicate the trend as a percentage of lactation yield.