Genetic and environmental effects on milk yield and fat percent in Isfahan dairy farms

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Introduction:

The oldest evidence of Breeding dates back to the time of R. Bake well, between 1760 and 1795, in Lister, Englnad. Later, kaling brothers, performed this process on the basis of performance, progenytesting , inbreeding , and particularly proper line breeding regarding the offspring.

The first Herd book was published in 1822, and in 1901 the first Blue book on the registration of the perfect sires daughters was published (1).

The program of improving and expanding the dairy cattle was established in 1906 in the U.S.A In 1930, the production of bulls daughters was compared with that of their mother cows. Various breeds of the dairy cattle differ from each other regarding their milk components. Holstein is popular for producing the highest amount of the milk with the lowest percentage of fat (1).

The present study is intended to investigate the role of the environmental and genetics effects on the milk yield and fat percentage in order to enhance these production in Isfahan province.

Materials and Method:

The information related to the first lactation period of Holstein dairy cows in 9 industrial dairy cattle farms in Isfahan province were collected from the National farm cattles Breeding Center. These records included the information about the first lactation period of 3145 cows which had 2556 dams and 193 sires. The records of the monthly milk were registered once from the related cattle herds. These records Contained the information on the quantity of the daily milk yield as well as fat and protein percentage. Thruogh the use of the monthly records of the raw milk yield and its fat quantity , the fat percentage and also the length of each cattle lactation period were Calculated.

In order to find out the amount of the total milk produced by each cattle , the amount of the milk in each record was multiplied by the time interval between the two records and then the results were added to each other. To figure out the fat quantity of the milk, the fat percentage of the milk was multoplied by the amount of the milk in each record and the result was again multiplied by the time interval between the two record, and then the results were added to each other.

The statistical model used on the basis of 305 days of lactation and %4 corrected fat milk was the following.

$YiJklmno = \mu + Gi + SiJ + Hk + Sem + TWn + AFCo + eiJkimno$

μ = The mean of the population

Gi = The effect of the number i. Sire group (G=2)

SiJ = The effect of the number J.sire in the number i. Sire group

Hk = The effect of the number k. cattle herd.

Yi = The effect of the number L.year of the calving

Sem = The effect of the number m. season of the calving

TWn = The effect of the number n.type of the calving

AFCo = The effect of the number o. age of the first calving

eiJklmno = The effect of the error

To find out the heredity value , model I of the Harvey statistical software program (1990) was used (4).

Results and Discussion :

The summary of the information on the related animals and their pedigree , also the avarage amount of the milk, fat percentage and other measurements related to the record, of the first lactation peroid of 3145 Holstein dairy cow in 9 dairy farms of Isfahan are presented in table 1.

The avarage of the total milk yield in the present study , with the standard deviation of 1956 kg , was 6787 kg. This avarage is close to the average total milk yield of the province in 1996 reported by the National farm cattles Breeding center. However , it exceeds the national avarage amount which was announced as 6120 kg by the same center (9).

The average amount of the corrected milk on the basis of %4 fat , with 1578 kg standard deviation, was 5522 kg. This average is less than the average amount reported by the National farm cattles Breeding and milk improvement center in 1996 as 5705 kg. But , it exceed , the national average amount reported as 5185 kg.

In the present study , the average amount of the corrected milk on the basis of %4 fat and 305 days of lactation was 5262 kg, with 1274 kg standard deviation. It is less than the average amount announced by the National farm cattles Breeding and milk Improvement center in 1996 as 6084 kg. However , it is very much close to the national milk average amount reported as 5268 kg.

In the present study , the average percentage of the milk fat was found to be %2/69 , with %44 standard deviation. This average is less than both the provincial average fat , announced as %2.76 by the National farm cattles Breeding and milk Improvement center in 1996 , and the national fat yield reported as %2.98 by the same center.

Keave and Colleagues (1978) reported the average amount of the corrected milk as 5345/4 kg , on the basis of 305 days of location and %3/53 fat , for the first location period.

In case the amount of the corrected milk in this research was corrected for %4 fat , It would have been 4987 kg. According to this research the fat percentage produced (%2.98) has been very much less , while , the amount of the corrected milk, on the basis of %4 fat and 305 days of lactation (5262 kg) has been more.

In a study , Van vleck and etc (1998) , on the basis of 2 times of milking and 305 days of lactation , announced the average amounts of the corrected milk and fat as 8630 kg and 313 kg respectively.

According to this study , the average fat percentage has been %3/63 , which is very higher than the estimated amount in the present study.

Foster and etc (1988) , on the basis of the age of te maturity , reported the average amount of the corrected milk and the fat percentage as 7146 kg and %3/53. These results are higher than those achieved in the present study. Heainrichs and etc (1993), on the basis of 305 days of lactation , reported the avarage amount of the corrected milk as 6739 kg and at quantity as 245 kg. The fat percentage of the milk has been %3.64.

According to the above mentioned studies , and others conducted in other countries, it can be concluded that , with regard to the production ability of

Holestin which is preserved in many countries around the world , a plan should be followed in order to increase the amount of the milk and fat yield through the genetics and environmental effects so that it would be possible to get most out of the production ability of this breed.

Table 1- The summary of the information

Number of animals 3145
Number of dams 2556
Number of sires 193
Number of endotic sires 69
Number of exotic sires 124
Number of herds 9
Number of years 8
Number of seasons 4
Average total milk yield (kg) 6878
Average corrected milk yield on the basis of %4 fat (kg) 5522
Average corrected milk yield on the basis of %4 fat and 305 days of lactation 5262
Average fat percentage (percentage) 2/6933
Average age of the first calving (month) 26/65

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