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Effect of Sires and Raising Areas on Body Weight of Holstein Friesian Cows in Northern Thailand

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Abstract

The government of Thailand supports dairy development in northern districts of Chaiprakan and Maeon. Chaiprakan district is a mountainous area with lower temperatures than in Maeon district. There are now around 128 smallholder dairy farms in Chaiprakan district and 120 in Maeon district of less than 10 cows and both districts are supplied with semen for artificial insemination from the same source. It is not clear however, whether the different district environments are constraining dairy production because the two areas have differences in management, feeds and temperature. Underweight dairy cows have been observed and there are allegations that sires or environment may be the cause. The objective of this research in Maeon and Chaiprakan districts, Chiangmai Province was to evaluate the effect of raising area, sires and their interaction on body weight of 298 Holstein Friesian cows. The cows were offspring of 17 different sires and of varying age.

There were no differences ($P>0.05$) in body weights of cows bred from the different sires. The raising area (Maeon and Chaiprakan districts) affected total body weight. Cows raised in Chaiprakan district had significantly ($P<0.05$) higher body weights than cows raised in Maeon district. The mean and standard error of body weight of cows from Chaiprakan and Maeon district were $415.65 \text{ kg} \pm 4.07$ and $382.72 \text{ kg} \pm 4.57$ respectively. There was no interaction between sires and raising area on body weight ($P>0.05$). These observations suggest that the environmental factors in Chaiprakan district are more favourable for dairy cows than in Maeon district. Maeon district factors are constraining genetic performance.

Key words: Holstein Friesian, Raising area, Body weight

Introduction

In dairy farming, many environmental factors affect productive traits such as temperature, feed quality and farm management etc. In tropical countries, temperature and feed are the major factors. The performance efficiency of dairy cattle at all ages is to a great extent influenced by both high and low temperature conditions. Therefore, alterations in feeding to meet the nutritive requirements for maximum performance under hot conditions are necessary. However, due to variability in management systems employed on dairy farms, there is a tendency to generalize and the dairy cattle are usually not fed for maximum growth rate or full genetic potential for milk production.

Bradly (1978) reported that dairy cows imported from another country to Morocco took some period to develop performance due to the environmental effects. One factor which influence performance is raising area. Hajjani (1986) reported that the interaction between origin of population and environment were highly significant for productive performance. There are interactions between genetics and environment. The genetic correlations between milk yield, fat yield and fat content of half-sib daughters of sires from Netherlands and Germany were positive whereas they by daughters of Danish sires were negative. This situation may be interpreted as a genetics and environment interaction. The above research shows that areas (environment) and genetics affect productive performance. The objective of this research were to determine the effect of sires (genetics), raising areas (environment) and their interaction on body weight of dairy cows in Northern Thailand.

Materials and Method

Data: Weight of 298 dairy cows from Maeon and Chaiprakarn Districs.

Data Analysis: For the analysis of effect of sires and raising areas on body weight the GLM procedure of SAS (SAS, 1990) were used. The model were as following:

$$y_{ijkl} = \mu + a_i + c_j + a_i c_j + e_{ijkl}$$

where

y_{ijkl}	is	weight of cows
μ	is	mean of population
a_i	is	effect of sires
c_j	is	effect of raising areas
$a_i c_j$	is	interaction between sires and rising areas
e_{ijkl}	is	random residual error

Results and Discussion

There were no effect of sires and interaction between sires and raising area on body weight of cows ($P > 0.05$). These results are different from the results of Bradly (1978) and Hajjani (1986) which might be caused by the relative small difference in genetics of sires. However, the factor raising area affected body weight as shown in table 1. The body weight of cows raised in Chaiprakan district was higher ($P < 0.05$) than the body weight of cows raised in Maeon district. This shows that the major effect affecting weight of cows was raising areas. The average and standard deviation of body weight in each districts are shown in table 2.

Table 1. ANOVA table of effect of sires, raising areas and their interaction

Source	df	Mean Square	F	Sig.
Sires	67	2656.255	1.235	0.142
District	1	11206.402	5.211	0.024
Sires* District	5	1473.471	0.685	0.635
Error	166	2150.464		

Table 2. The Average and Standard Deviation of Body Weight in each district

Districts	N	Body weight \pm S.E.
Chaiprakan	162	415.45 \pm 4.07 ^a
Maeon	72	382.72 \pm 4.57 ^b

^{a,b} Means within a column with different superscripts differ Significantly (P < 0.05)

Conclusion

These observations suggest that the environmental factors in Chaiprakan district are more favorable for dairy cows than in Maeon district. Maeon district factors are constraining genetic performance.

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