Association between milk production and Holstein fraction of upgraded dairy cattle in the Thai tropics

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INTRODUCTION

Dairy production has increased in many tropical countries. Upgrading of local breeds and crossbred cattle to Holstein (H) has been used as a strategy to increase milk production. However, agricultural areas in tropical countries usually have high temperature and humidity levels. These conditions could be limiting factors for milk production of dairy cattle (Bootham et al., 2007). Furthermore, H is a dairy breed that originated and has been improved under temperate environmental conditions. Increasing the H fraction of crossbred dairy cattle under tropical conditions would increase their milk yield (Elzo, 2015). Therefore, the association between milk production and H fraction is not linear in Thailand. Understanding the association pattern between milk production and H fraction can help to improve milk yield. 

Dairy cattle in Thailand have been categorized into different Holstein fractions, the most popular categories being Holstein (H), Brahman (B), Highlander (G), and crossbreeds. The Holstein fraction is a traditional genetic index that measures the percentage of Holstein genes in a group of dairy cattle. 

RESULTS AND DISCUSSION

Milk production differed across Holstein fractions, using age and breed groups (Table 1). In a previous study, milk production in Holstein fraction group (H) was the highest compared to Brahman (B) and Highlander (G) groups. These results are consistent with the findings of many other studies that have reported a higher milk production in Holstein groups compared to Brahman and Highlander groups. 

The LSM for MF across breed groups ranged from 3.44 ± 0.14 to 4.20 ± 0.17 kg. The highest milk production was observed in the Holstein fraction group (H), followed by the Brahman (B) and Highlander (G) groups. Moreover, the H fraction significantly increased milk production in all breed groups compared to other Holstein fractions, indicating that the Holstein breed is more suitable for milk production in Thailand. 

The association between MF and H fraction in Central Thailand increased the lifetime milk yield of dairy cows. The milk production in dairy cows increased with an increase in the H fraction, indicating a positive association between MF and H fraction. The association was stronger in dairy cows with a higher H fraction, indicating that the Holstein breed is more suitable for milk production in Thailand. 

 condições de alta temperatura e umidade, o aumento na produção de leite foi significativo. A produção de leite em resíduos de cruzamento foi menor em comparação com a produção de leite em resíduos de cruzamento de raças holstein.portadoras de genética holstein. 

Milk production in different Holstein fractions (kg)

<table>
<thead>
<tr>
<th>Holstein Fraction</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>4.20</td>
<td>0.17</td>
<td>3.86</td>
<td>4.52</td>
</tr>
<tr>
<td>G</td>
<td>3.44</td>
<td>0.14</td>
<td>3.10</td>
<td>3.82</td>
</tr>
</tbody>
</table>

In conclusion, the Holstein breed is the most suitable for milk production in Thailand, and upgrading dairy cattle to Holstein fractions can significantly increase milk production. Further research is needed to understand the genetic and environmental factors that influence milk production in Holstein fractions.