EFFECT OF BREEDS ON GROWTH PERFORMANCE AND CARCASS PERFORMANCE ON THAI BEEF CATTLE

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Abstract – Breed effects on live weight gain, carcass performance, and cost profit were compared among Brahman (B), Charolais x Brahman (CB), Charolais x Brahman x Native (CBN), and Tak (62.5% Charolais, TA) in contracted farmers from Tak, Kamphangpetch, Sukhothai, and Phitsanulok during 2001-2013. The experiment involved totally 458 animals. The target slaughter live weights were determined 450 kg. The CB and CBN cattle gained more rapidly (P < 0.01) than TA and B. The TA cattle had higher (P<0.01) dressing percentage than the other breeds. The CB cattle had the highest profit return rate, 39.07% (P<0.05). The 50% Charolais crossbred (CB and CBN) generally tended to achieve higher live weight gains during the experiment, by the effects additive and heterosis. The developed breeds (B and TA), they had low heterosis effects. For utilization of fattening program, the crossbreds as commercial breeds are more suitable than pure breed and developed breeds.

Key Words – beef cattle, breeds, growth, carcass

I. INTRODUCTION

There are many beef breeds currently raised in Thailand. The major breeds are crossbred of Brahman, Charolais, Angus with Thai native cattle. In addition, Department of Livestock Development conducted research to establish new beef cattle breed from 62.5% Charolais and 37.5%Brahman called Tak cattle (TA) in Tak Livestock Research and Breeding Center. There are Brahman (B), Charolais x Brahman (CB), Charolais x Brahman x Native (CBN), and Tak (TA) cattle included in this experiment. Breed differences in production traits are important genetic resources for improving beef production and carcass composition. No single breed excels in all traits that are important for beef production [1, 2]. Differences between beef breeds in growth and carcass traits were evaluated by many researchers [3, 4, 5]. Numerous reports have been published on carcass characteristics of different sire breeds compared in extensive crossbreeding trials [2, 6, 7, 8, 9, 11]. The objective of the present study was to evaluate breed effects on live weight gain, carcass performance, and cost profit among Brahman (B), Charolais x Brahman (CB), Charolais x Brahman x Native (CBN), and Tak (62.5% Charolais, TA) in contracted farmers from Tak, Kamphangpetch, Sukhothai, and Phitsanulok during 2001-2013.

II. MATERIALS AND METHODS

Animal

Four breeds of cattle were used in this study.

1. Eight Brahman cattle (B)
2. Ninety two Charolais x Brahman cattle (CB)
3. Three hundred and thirty seven Charolais x Brahman x Native cattle (CBN)
4. Twenty Tak cattle (TA)

These cattle were fattened at contracted farmers from Tak, Kamphangpetch, Sukhothai, and Phitsanulok during 2001-2013. Animals were fed with Pangola grass (*Digitaria eriantha*), rice straw, and concentrates (12% CP) followed the instructions of Tak Livestock Research and Breeding Center. They were slaughtered at Tak Livestock Research and Breeding Center. The target slaughter live weights were determined 450 kg by the reasons of tender, low fat meat, and optimized cost. The data of carcass performance were collected. Different types of data were

collected: growth performance [body weight, average daily gain (ADG)], carcass performances (carcass percentage), and economic performance (net income per head). Data on all growth and carcass traits were presented as lsmean±standard error. Data on various growth and carcass traits were analysed by analysis of GLM [12].

III. RESULTS AND DISCUSSION

Growth performances and economic potential of Thai beef cattle

The CB had the biggest size. The ADG during fattening periods of CB cattle were 0.953 kg per day (Table 1). The CB cattle received additive genetics and heterosis genetics from Charolais and Brahman cattle. In addition, the B cattle were bigger frame than BN cattle. For TA cattle, they were in breeding program to establish TA pure breed, so they had lower heterosis genetics than CB (F1) and CBN (F2). The target slaughter live weights were determined 450 kg. The slaughter weight differed significantly ($P < 0.01$) among 4 breeds, the CB had the highest slaughter weight, 423.03 kg.

For the two groups, CB and CBN they are F1 and F2 animals. They were bred for slaughter program. They could get higher heterosis for higher growth performance, easy raising, good adaptive, low cost production [13]. The TA cattle had ADG higher than the B cattle because of additive and heterosis effects.

The CB cattle gave the highest net income (7,300.53 bath/head). Farmers could finish 10 – 20 cattle per year, and they could earned money more than 73,005 bath per year. They could earn from finishing beef cattle while having other occupation, such as government employee, company employee, and other agriculture occupation. Beef cattle finishing was good occupation with good income for farmers and provided protein consumption to consumers.

Carcass performances of Thai beef cattle

The results of slaughter traits are shown in Table 2. For dressing percentage, The B cattle were significantly lower ($P < 0.01$) than the other breeds. Similarly to Deland *et al* [14], dressing percentage for carcasses from Brahman cattle was lower than carcasses from Charolais cattle ($P<0.05$). The carcass percentage of TA was highest ($P<0.01$). In the same as the result from Oh *et al*. [15], the carcass percentage of 50% Charolais was bigger than 25% Charolais. In TA cattle had more Charolais level than CB and CBN cattle. In addition TA cattle were developed for high carcass percentage at optimum weight, 450 kg. The carcass weight was an important factor affecting meat quality through its effect on fattiness [16]. Rossi *et al.* [17] described that a premium product could offset the feed cost.

Table 1 Growth performance and economic potential of Thai beef cattle

	B	CB	CBN	TA
No.(head)	8	92	337	20
W1 (kg)**	211.26^{d} ±6.81	244.07^{a} ±6.29	232.15^{b} ±7.63	219.13^{c} ±4.77
W2 (kg)**	384.50^{d} ±12.39	444.21^{a} ±11.44	422.52^{b} ±13.88	398.82^{c} ±8.69
ADG (Kg/day)**	0.825^{d} ±0.027	0.953^{a} ±0.025	0.907^{b} ±0.030	0.856^{c} ±0.019
DMI (Kg/day)**	14.15^{d} ±0.46	16.35^{a} ±0.42	15.55^{b} ±0.51	14.68^{c} ±0.32
Net income/head (baht/head)**	6280.59^{d} ±211.62	7300.53^{a} ±195.44	6930.10^{b} ±237.07	6525.21^{c} ±148.39
Total cost/head (baht/head)**	16212.66^{d} ±513.07	18685.54^{a} ±473.85	17787.42^{b} ±574.78	16805.77^{c} ±359.77

** Different letter in the same row lsmeans highly significant difference of lsmeans between genotypes ($P<0.01$) B=Brahman, CB=Charolais x Brahman, CBN= Charolais x Brahman x Native, TA=Tak W1=initial weight, W2=final weight, DMI=dry matter intake

Higher lean percentage yields were also recorded in carcasses from CBN cattle. In CBN cattle, there is composition of Native cattle in this group. No significant differences were recorded in the bone percentage. The TA cattle had the lowest similarly to fat percentage.

Table 2 Carcass performance of Thai beef cattle

	B	CB	CBN	TA
No.(head)	8	92	337	20
%Carcass**	57.20[c] ±0.62	58.56[b] ±0.60	57.50[c] ±0.65	59.33[a] ±0.31
%Lean meat	39.56 ±3.37	39.53 ±2.69	40.64 ±3.33	39.80 ±4.10
%Fat	8.37 ±2.89	7.21 ±1.47	7.59 ±1.49	6.14 ±1.37
%Bone	7.75 ±1.43	6.74 ±1.28	6.90 ±1.34	6.52 ±0.82

** Different letter in the same row lsmeans highly significant difference of lsmeans between genotypes (P<0.01) B=Brahman, CB=Charolais x Brahman, CBN= Charolais x Brahman x Native, TA=Tak

IV. CONCLUSION

In conclusion, CB and CBN have shown higher BW gain during growing period. The CB cattle gave the highest net income. Carcass percentage was the highest in TA cattle. Lean percentage was highest in CBN cattle. Fat and bone percentage were lowest in TA cattle. The results of this study showed that F1 crossbred of Charolais and indicus cattle is optimized for slaughtering. And also new establish breed is important for slaughtering production. Whitmore genetic improvement of growth and carcass performance, they have the potential to increase sustainability of beef cattle production and protein consumption in Thailand.

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