DUROC SIRES USED TO IMPROVE THE INTRAMUSCULAR FAT IN THE TERMINAL LINE TO ENHANCE THE GROWTH AND MEAT QUALITY

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SUMMARY

Through the Trial Production Project, we carried out the selection in improving intramuscular fat in the Duroc line (DB) from new genetic resources. After the selection, this boar line was improved by reducing the age at 100 kg from 178.6 days to 171.8 days and increasing the intramuscular fat by 4.9% in comparison to 3%. The terminal crossbred between improved intramuscular fat Duroc line and Pietrain (PDM) gained with daily gain potential of 852g and age at 100 kg of 174.1days. The intramuscular fat in the improved intramuscular fat terminal boar line (PDM) tends to improve as higher as 3.1% versus 2.6 % in PD.

INTRODUCTION

In recent years, the terminal boars have been popularly used because of high hybrid vigor. In order to increase the learn percentage in the commercial herd, McLaren *et al.* [3] had used (Spotted x Duroc boar) to breed with F1 Yorkshire Landrace sows. The results showed that, the age at 100kg was shortened to 182.7 days versus 184.5 days using Spotted terminal boar. With the aim of improving meat quality, Arthur Rybarczyk [2] had used many different terminal boars and evaluated meat quality from the combinations of F1 hybrid sows on the Polish Landrace × Polish Large White male using L.990 × Pietrain (LP), Pietrain × L.990 (PL), Duroc × Pietrain (DP), Pietrain × Duroc (PD). The study results showed that, the percentage of intramuscular fat and meat color in males were higher than that of females in all combinations. The hybrid combination with Duroc breed gained higher intramuscular fat content which has good influence on meat quality.

To meet the increasing demands of the market, Le Pham Dai [1] had carried out studies on some crossbred boars of Pietrain x Duroc (PD), Duroc x Pietrain (DP) and Pietrian x Duroc x Landrace (PDL). The study results showed that these combinations have good conformation and higher growth ability. The recent market however requires the terminal boars may eventually produce commercial pigs with fast growth and better meat quality.

One of the objectives in the implementing of the Trial Production Project is aim to breed the ultimate terminal line from Duroc breed for improving growing rate, intramuscular fat percentage and meat quality to meet the new market trend.

MATERIALS AND METHODS

Selection Duroc line by increasing intramuscular fat percentage

Duroc boars of 105-125 kg had been firstly measured the back fat thickness, ribeye depth and intramuscular fat percentage by using Biosoft Toolbox method of Biotronics. inc. From the first higher intramuscular fat multipliers we carried out breeding new Duroc line (DB). The short survey would be carried out to determine how differences in intramuscular fat percentage and growth rate between same existing Duroc (DD) and the new Duroc line (DB) as a basis for breeding.

Terminal crossbreeding steps

Step 1: ♂PP x DD ♀ = ♂ / ♀PD

Step 2: DB♂ x ♀ PD = ♂ PDM

PP: Pietrain, DD: pure Duroc breed, PD: Pietrain x Duroc; DB: new Duroc line with higher intramuscular fat content, PDM: improved intramuscular fat terminal boar line.

Comparative trial of individual testing performance of terminal boars for IMF trait

Lot 1 (PDM) : 10 pigs/lot – Testing

Lot 2 (PD) : 10 pigs/lot – Control

Studied Parameters: market weight (kg), age at 100kg using NSIF (2002) standards, NAC%: lean percentage estimated by The Kyriazakis's method, Y% = 59 to 0.9 P2 (mm) + 0.2 P2 ribeye depth (mm) and intramuscular fat percentage.

RESULTS AND DISCUSSION

Performances of Duroc lines

Table 1. Growth traits and intramuscular fat percentages of two Duroc lines (µ±SD)

	n	Pkg	IMF	BF	DayTHAN	Day100	Nac%
DD	17	114.2[a] ±6.6	3.0[b] ±0.8	11.9[b] ±1.0	56.1[a] ±4.8	178.6[a] ±6.3	59.6 ±1.0
DB	35	113.6[a] ±4.4	4.9[a] ±1.2	13.9[a] ±1.3	56.5[a] ±3.8	171.8[b] ±5.6	58.0 1.5

Means in the same column with different superscripts are significant difference at p<0.05

Pkg: weight at measuring time, IMF: intramuscular fat percentage, BF: backfat thickness, DayTHAN: Ribeye depth, Day100: Age to 100kg (day), Nac%: lean Percentage.

The results in the Table 1 showed that the growing rate of DB line is better than pure Duroc breed. The days to 100 kg of DB are 171.8 versus 178.6 days of the Duroc breed. There is significant difference in IMF of DB line (4.9%) compared to Duroc breed (3%).

Crossbreeding test for new terminal boars

Genetic parameters from performance tested terminal boars were examined at Binh Thang Testing Centre. The results are presented in Table 2.

Table 2. Performance testing results (µ±SD)

	n	P120	Pkt	ADGkt	BF	FCR	Day100
PDM	10	52.5 [a] ±5.0	103.6 [a] ±6.6	852 [a] ±112	13.7 [a] ±1.0	2.83 [a] ±0.15	174.1 [b] ±5.9
PD	10	51.2 [b] ±3.0	97.1 [c] ±4.8	765 [b] 67.5	10.6 [b] ±1.1	2.95 [a] ±0.18	179.9 [a] ±5.7

Means in the same column with different superscripts are significant difference at p<0.05

PDM: IMF improved terminal line, PD: D x P terminal line, P120: weight at 120 days (kg), Pkt: final weight of performance testing, ADGkt: daily gain (g), BF: backfat thickness (mm), FCR: feed conversion ratio, Day100: days at 100 kg.

The results in Table 2 showed that the PDM terminal line has good growth potential with average daily gain of 852 g and age to 100 kg of 174.1 days in comparison to PD terminal line with 765g and 179.9 days, respectively. The FCR is better in PDM line (2.83) than in PD line (2.95).

Table 3. Growth traits and intramuscular fat percentages of two terminal lines (µ±SD)

	n	Pkg	IMF	BF	DayTHAN	Day100	Nac%
PD	15	111.6 ±10.4	2.6[a] ±0.4	11.1 ±1.1	55.8 [b] ±2.8	179.2 [a] ±8.2	60.1 [a] ±1.2
PDM	11	114.7 ±4.5	3.1 [a] ±0.9	14.1 ±1.7	59.5 [a] ±1.8	173.6 [b] ±7.5	58.2 [a] ±1.6

Means in the same column with different superscripts are significant difference at p<0.05

The results in Table 3 showed that the growth potential of the PDM is better than PD. The age at 100 kg of PDM is 5.6 days shorter than PD (173.6 days versus 179.2). The IMF of the first is tended to improve compared to the second (3.1% versus 2.6%), but no significant difference.

CONCLUSIONS

- The selection of DB line had increased the IMF to 4.9% and shorted age at 100 kg down to 171.8 days compared to 3% and 178.6 days of Duroc breed, respectively.
- The terminal line PDM has good performance in daily gain of 852 g and the age to 100 kg is 5.6 days shorter than PD line. In addition, IMF trait tended to improve higher, from 2.6% in PD to 3.1% in PDM.

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