

# TERMINAL SIRES BY CROSSING DUROC AND PIETRAIN LINES

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## Introduction

The sire plays an important role for the improvement of production and meat quality in commercial pigs. Up to now, crossbred boars have been widely used as terminal sires to produce fatteners in developed countries. In Vietnam, Duroc and Pietrain pigs have been imported for over one decade and used as sire lines for rapid growth and good quality meat. The combination of these two lines to produce terminal boars was the aim of this study.

## Results

The combination of Pietrain and Duroc lines to produce terminal sires was done by two ways. The first way was that Pietrain boars were used to mate with Duroc sows and crossbred progenies are called "PD". The opposite way was done by using Duroc boars to mate with Pietrain sows and called "DP". The contribution of Duroc and Pietrain to the crossbred sires was equal. In order to conduct this study, 34 Duroc and 14 Pietrain pigs in purelines were used to produce 65 sires of DP and 125 sires of PD at Binh Thang Pig and Poultry Research Center and Dong A breeding pig farm from 2001 to 2004 for study. Boars were tested their individual performance and evaluated for selection based on Terminal Sire Index of growth and backfat traits. The figures of individual performances testing from purebreds and crossbreds were presented in table 1.

The initial weight for the performance test (at 60 days old) was nearly the same for both purebreds and crossbreds (20.05 to 20.50kg). At 120 days old, there was not any difference found on the weight among four groups of Pietrain (PP), Duroc (DD), Duroc x Pietrain (DP) and Pietrain x Duroc (PD). However, the weight difference of these pigs became clearer at 180 days old among groups. Average daily gain of crossbred sires (DP and PD) was remarkably higher than purebred ones (PP and DD). Similarly, crossbred sires (DP and PD) were improved very much as compared to purebred sires (PP and DD), between 7.7 – 10.6% and 16.1 – 24.2% respectively for feed conversion ratio and backfat thickness.

Table 1. Individual performance testing of purebreds and crossbreds of Duroc and Pietrain

Items	PP	DD	DP	PD
Number of pigs	32	74	65	125
Initial weight (kg)	20.05 ± 3.06	20.34 ± 2.14	20.50 ± 1.73	20.25 ± 1.62
Weight at 120 days old (kg)	38.76 ± 4.12	40.06 ± 3.67	40.77 ± 3.17	39.60 ± 4.84
Weight at 180 days old (kg)	90.27 ± 8.25	92.30 ± 7.48	93.47 ± 6.85	94.17 ± 7.55
Average daily gain (g)	585.2 ± 62.4	608.0 ± 59.5	682.1 ± 34.9	697.7 ± 29.3
Feed conversion ratio	3.21 ± 0.37	3.12 ± 0.28	2.88 ± 0.19	2.87 ± 0.15
Backfat thickness (mm)	11.25 ± 1.95	10.53 ± 1.66	8.83 ± 0.75	8.53 ± 0.90

At the end of individual performance testing, the evaluation of semen quality was carried out on 5 boars of each group. The semen quality test of 5 to 10 times for each boar was taken place at different days. On volume per ejaculation (V), the motility (A), density (C) and total number of motile sperms per milliliter semen (VAC). The volumes of semen per ejaculation varied from 102.35 – 126.67 ml among genetic groups with highest in DP group. The motility was not much different between purebreds and crossbreds, ranging from 0.72 to 0.78. However, the density was much higher in crossbreds of DP and PD as compared to purebreds of DD and PP. Therefore, total number of motile sperms per milliliter from crossbred sires was significantly larger than that of purebred sires. This is really good for artificial insemination.

Table 2. Semen quality of crossbred sires (DP and PD) and to purebred sires (PP and DD)

Genetic groups	Number of tested pigs	Volumes (ml/ejaculation)	Motility	Density (x10 <sup>6</sup> /ml)	total number of motile sperms (x10 <sup>9</sup> /ml)
Pure sires PP	5	102.35 ± 27.52	0.72 ± 0.09	198.55 ± 38.25	14.63 ± 5.75
Pure sires DD	5	113.00 ± 24.64	0.75 ± 0.07	212.44 ± 31.06	18.87 ± 4.29
Crossbred sires DP	5	126.67 ± 25.63	0.78 ± 0.04	293.95 ± 34.80	28.25 ± 4.50
Crossbred sires PD	5	121.87 ± 23.33	0.76 ± 0.05	288.50 ± 30.95	23.55 ± 5.05

As indicated in table 3, generally, fattening pigs from PDxLY group were better than that from PPxLY or DDxLY groups for the weight at 180 days of age, average daily gain, feed conversion ratio and backfat thickness. As compared to the sires of PP and DD, the use of PD as terminal sire to mate with sows of LY resulted in the improvement for average daily gain by 25.6 – 35.6 gram, for feed conversion ratio by 0.15 – 0.22 and for backfat thickness by 0.07 – 1.61mm in fattening pigs during the period of 60 – 180 days old.

Table 3. The performance of fattening pigs using crossbred (PD) and purebred sires (PP and DD) for mating F1 Landrace x Yorkshire sows (LY)

Items	PP x LY	DD x LY	PD x LY		
			Farm #1	Farm #2	Average
Number of tested pigs	48	84	149	60	209
Initial weight (kg)	20.12 ± 2.85	20.06 ± 2.42	20.09 ± 1.81	20.10 ± 2.60	20.10 ± 2.22
Weight at 180 days (kg)	92.34 ± 7.51	94.07 ± 6.03	96.35 ± 5.36	97.80 ± 7.60	97.08 ± 6.48
Average daily gain (g)	602.7 ± 56.4	616.7 ± 42.1	635.5 ± 55.8	649.0 ± 30.9	642.3 ± 39.2
Feed conversion ratio	3.16 ± 0.56	3.09 ± 0.27	3.02 ± 0.27	2.86 ± 0.18	2.94 ± 0.23
Backfat thickness (mm)	11.75 ± 2.42	10.84 ± 1.63	9.57 ± 1.44	10.70 ± 0.99	10.14 ± 1.25

After finishing the fattening period, 40 tested pigs were slaughtered to evaluate the carcass quality. The carcass components are presented in table 4. Although, the carcass percentage of fattening pigs was not different among genetic groups but their lean meat was significantly different from using PD sires, increasing by 3.37 % and 1.71% respectively as compared to using PP or DD sires.

Table 4. Carcass components of fattening pigs using crossbred (PD) and purebred sires (PP and DD) for mating F1 Landrace x Yorkshire sows (LY)

Items	PP x LY	DD x LY	PD x LY		
			Farm #1	Farm #2	Average
Number of tested pigs	12	10	14	4	18
Live weight (kg)	94.35 ± 4.45	94.25 ± 3.50	94.75 ± 3.96	94.30 ± 4.56	94.50 ± 4.26
Carcass weight (kg)	65.35 ± 1.78	65.75 ± 1.49	66.55 ± 3.16	66.37 ± 4.10	66.46 ± 3.62
Carcass percentage (%)	69.26	69.80	70.42	70.06	70.24
Lean meat (%)	59.14	57.48	61.14	60.56	60.85

## Conclusions

The average daily gain, feed conversion ratio and thickness of crossbred sires (DP and PD) were remarkably improved compared to purebred ones (PP and DP). The semen quality of these crossbred sires was much higher than that of purebred sires.

When using these crossbred boars (DP and PD) as terminal sires for meat production, the average daily gain, feed conversion ratio and backfat thickness was improved significantly in fattening pigs during the period of 60 – 180 days old, and their lean meat was also increased by 1.71 – 3.37%.