Deschambault Swine Testing Station

Trials 32 and 33

Assessment of sire lines:

- **Genesus Duroc**
- **Magnus**
- **Talent**
- **Tempo**

Commercial hog performance data
Final Report

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Introduction

The Deschambault swine testing station is a tool used by Quebec's swine industry to answer some of its important questions and certain production needs. Improving productivity and product quality as well as a better understanding of market needs are priorities of the different Quebec pork networks. To address these challenges, the Deschambault test station has allowed, for several years, Quebec's commercial producers and pork industry stakeholders to better understand the performances of the different sire lines present in Quebec.

The results of station trials at Deschambault constitute performances evaluated in a controlled environment through planning and monitoring by the Centre de développement du porc du Québec inc. Furthermore, by improving their knowledge of the genetic lines available, breeding companies can better target their breeding objectives, while validating their efforts in relation to the needs of Quebec's swine sector.

Since 2006, the results of station trials have described objectively the performances of twelve sire lines:
Trials 19-20 : Duroc, P76, PIC 337, Vivanda 300
Trials 21-22 : Duroc Sogéporc, EB5®, Genex Duroc, QBX™
Trials 23-24 : Duroc, PIC 280, ROCK-Y
Trials 25-26 : G Performer, Shade Oak Duroc

This report presents the continuity of these trials with the assessment results of four new sire lines, namely:

- **Genesus Duroc** from Genesus Inc.
- **Magnus** from Hypor Inc.
- **Talent** from Topigs Canada Inc.
- **Tempo** from Topigs Canada Inc.

Objective of the project

The objective of this project was to measure, in a controlled and non-limiting environment, the live animal performances as well as the carcass and meat quality performances of commercial pigs born from sire lines representative of those available in Quebec.

Description of the trials

Two consecutive trials were carried out at the Deschambault swine testing station, the second (33) being a repetition of the first trial (32). Trials 32 and 33 took place from May 2012 to May 2013. The acclimation phase, which took place mainly in the nursery, is the post-weaning period during which the pigs' weights increased from 5.0 to 29.6 kg. For both trials, the testing phase corresponds to the growth phase in which the pigs weights increased from 29.6 kg to a targeted slaughter weight of 130 kg. Growth, carcass and meat quality performances were measured. During each trial, individual feed intake was measured using an automated feed recording system (IVOG). The time and exact duration of each visit to the feeder as well as the quantity of feed consumed were also recorded. This data, recorded continuously, not only allows to assess the actual feed intake of pigs, but also to study their feeding behaviour.

For the purposes of these two trials, animals originated from commercial breeders. In total, twelve farms provided piglets for Trial 32 and ten farms provided piglets for Trial 33, these ten farms having supplied piglets for both trials.

For more details and to obtain the complete description of the experimental protocol, the document “Trials 32-33 Protocol” is available at the following address: http://www.cdpq.ca/recherche-et-developpement/epreuves-en-station.aspx.

Results

1. Acclimation period

The results of the acclimation period (nursery) found in this report cover the performance data from all the piglets at the station. Raw data are presented across treatments and trials.

1.1 Feeding program

During the acclimation phase, only one feeding program was used for all piglets. The feeding program used during the acclimation phase was proposed by the retained feed supplier, except for the 4th feed, which was formulated as requested by the CDPQ. The feeding program was composed of cube-texture and medicated feeds, except the 2nd feed, which was not medicated. The feeding program, nutritional guidelines and the composition of the fourth feed are described in the experimental protocol of Trials 32-33.

The quantity of feed distributed per day was noted for each pen. Feed intake was calculated for all piglets and not on an individual basis. Feed leftovers were weighed and dead animals were considered in feed intake calculations. The piglets were fed *via* a feeding-trough during the first twelve days and using a dry feeder for the remainder of the acclimation period.

1.2 Health information

All piglets from Trials 32 and 33 received a combination of medications in feed, water and by injection to prevent health problems (Table 1 and Table 2). Additionally, piglets showing clinical signs of disease were treated with injectable medications according to the dosages outlined in Table 3. In circumstances where several piglets needed treatment, medications were administered in the water for all animals (Table 3).

The main causes for treatment are presented in Table 5. Medication use is presented as three indicators which are defined below (Table 6):

1. Intensity of use (IU) which represents the ratio between number of administered therapeutic doses (DT) and number of animal-days (AD);
2. Quantity of medication used per pig;
3. Cost of medication per pig.

The main causes of mortality or euthanasia are presented in Table 7.

At the beginning of Trial 32, during the acclimation phase, piglets were infected with the PRRS virus, which explains why there were six times as many treatments administered to piglets in Trial 32 compared with Trial 33 during acclimation. During Trial 32, the main reasons for treatment were poor general conditions, respiratory problems and exudative epidermitis, whereas in Trial 33 nervous system problems were the most significant, followed by digestive problems, then poor general conditions and locomotion problems (Table 5). Incidentally, during the acclimation phase of Trial 32, *Trimethoprim sulfa* was given in the water to all piglets due to the nervous system problems (meningitis) observed, probably increased by PRRS virus co-infection.

Moreover, in Trial 32, 24 out of 352 piglets died, which represents a mortality rate of 3.4% whereas in Trial 33, 8 piglets out of 352 died, representing a mortality rate of 2.3% (Table 7).). In Trial 32, the majority of these deaths were related to respiratory problems, then meningitis and sudden deaths, whereas in Trial 33 sudden deaths and meningitis were the main causes of mortality (Table 7).

1.3 Performance

Table 4 shows piglet growth and feed intake performance data during the acclimation period. The average acclimation period lasted 55.5 days, with piglets weighing 5.0 kg on entry and 29.7 kg at the end of the phase. For this period, an ADG of 438 grams/day was obtained. A feed conversion (FC) of 1.47 was observed for the overall acclimation period. This calculation of the FC was performed with overall consumptions and gains, and not individual measurements.

2. Test period

Data collected during the test period are shown in Tables 11 to 14. The means are adjusted to take into account various factors (e.g.: weight, sex, slaughter date, etc.) for different traits (see protocol to find out about variables considered in adjusted means).

2.1 Sampling

For the sire lines under study, a total of 672 animals began the testing phase, including 328 for Trial 32 and 344 for Trial 33. From this number, data on 652 animals was retained for analysis (317 for Trial 32 and 335 for Trial 33).

Table 9 shows the distribution of pigs kept for analysis. The distribution of animals by sex is relatively well balanced, namely 47.1% barrows and 52.9% females. Besides, each sire line accounts for nearly a quarter of animals present. As for the number of sires used, it varies between 15 and 23 sires per sire line.

2.2 Data exclusion

Of the 20 animals that started the trials but were excluded from analysis: 16 died during the trial (10 during Trial 32 and 6 during Trial 33), 1 was excluded for health reasons, 2 due to identification problems and 1 because he was not properly castrated.

2.3 Health information

No growth factors were used during the trials. Only pigs that showed clinical signs of disease were treated with injectable medications (Table 3). When the situation required the treatment of a large number of subjects, the latter was administered in the water to all subjects (Table 3).

It was found that the number and proportion of treated animals during the testing period of Trial 33 (159 out of 344 animals; 551 TD (injectable)) are three times higher than in Trial 32 (48 animals out of 328; 182 TD (injectable); Tables 5 and 6). The high number of treatments during Trial 33 resulted mainly from an episode of locomotor problems (refusal to stand), and also diarrheas. The main causes for treatment during Trial 32 were locomotor problems and prolapses of the rectum, most probably caused by mycotoxins in the feed.

During the test period, the mortality rate was 3.0% in Trial 32 and deaths were mainly due to locomotor problems (3 cases), other conditions (3 cases, including two cases of prolapses of the rectum leading to euthanasia) and two cases of wasting. In Trial 33, the mortality rate during the test period was 1.7% and these deaths were related to: one case of wasting, two cases of locomotor problems, one case with hernia leading to euthanasia, one case of cannibalism of the tail leading to paralysis and one case of multiple abscesses (Table 7). For comparison purposes, the mortality rates were nearly twice as high in Trial 32 with respect to Trial 33.

Finally, results from serological tests carried out at the end of the trials are presented in Table 8. These controls are used to determine the health status of the pig batches with regards to PRRS, pleuropneumonia (*Actinobacillus pleuropneumoniae*) and *Mycoplasma hyopneumoniae*. The two pig batches were of positive status regarding *Mycoplasma hyopneumoniae*. The batch from Trial 33 was tested negative for both pleuropnemonia and PRRS, whereas the batch from Trial 32 was considered positive for both diseases.

2.4 Feeding behaviour

The individual feeding system used in the trials for the recording of feed consumption data also allows to study the feeding behaviour of pigs. Results were analyzed for all barrow and female pigs for each of the trial periods. The feeding behaviour during the acclimation period was not assessed. Table 10 presents the feeding behaviour parameters that were studied. Only descriptive statistics are shown, and the differences between test periods have not been statistically analyzed. Every pig spent an average of 57 minutes per day at the feeder, which led to an overall occupation rate of about 49%. This rate varied little during the pigs' growth. It then seems that the availability of the feeder in the pen was sufficient considering the number of pigs per pen. This is also confirmed by the fact that 83.7% of the time spent at the feeder took place during the day (from 4:45 am to 9:00 pm), which still left plenty of time for feeding during the night.

Figures 1 and 2 show the average daily feed intake trend for Trials 32 and 33, respectively. Trend curves for the average temperature inside the building for each trial were added to each graph respectively. The graph of Trial 32 shows a significant drop in consumption. This is probably due to higher mycotoxin concentrations in feed during that period. In addition, a slight decrease in consumption during Trial 33 is also observed around day 55, this decrease coinciding, incidentally, with a short episode of sickness.

2.5 Overall live animal performances, carcass and meat quality

Average zoothechnical performance data are shown in Tables 11 and 12 (see "Overall" column) for all pigs. The average initial weight was 29.6 kg whereas the final weight was 129.7 kg. The average daily gain was 1,063 g/day and feed conversion was 2.54 kg/kg. Performance data are considered excellent for commercial pigs originating from several herds, especially since no growth factor was administered as a preventive measure during the test period. The conditions in the testing station therefore allowed pigs to adequately express their genetic potential.

The results pertaining to carcass quality are presented in Table 13. The carcass cutout is standardized and follows primal pork cuts presented in the Canadian Pork Buyers Manual. Carcasses were cut into four primal cuts: ham, loin, shoulder and belly. Average weight and average weight ratio of each cut with respect to the reconstituted half carcass weight are based on all station-tested pigs.

Meat quality results are presented for the loin and the ham in Table 14. The different measures are described in the CDPQ's manual on methods to evaluate meat quality.

For each variable analyzed, the use of a covariable is indicated in Tables 15 to 17.

2.6 Performance by sex

Tables 15 and 16 show the performance data for barrows and females. As expected, barrows show significantly higher growth rates, daily consumptions, feed conversions (except in phase 1), and backfat thickness than females. As expected too, females show a significantly higher level of muscle depth and lean yield than barrows. Furthermore, neither the carcass yield nor the index was affected by sex, however, an interaction can be noted between the sex and the sire line for the index.

Carcass and meat quality results by sex are presented in Tables 17 and 18. Although the weight and the carcass yield were not affected by the sex (Table 15), the reconstituted half carcass weight adjusted by the off-test weight (in covariable) is significantly higher in females. Considering that the primal cuts yields are calculated by using the half carcass weight as denominator, the effect of sex on the reconstituted half carcass weight seems to be accounted for by the fact that the loin and shoulder yields are significantly higher in barrows, while the weights of these cuts, adjusted by the off-test weight (in covariable), are not affected by sex. Furthermore, the loin eye area, the carcass length, and the leg weight and yield are significantly higher in females.

Except the fact that the score for marbling is higher in barrows and the colour is subject to an interaction between sex and the sire line, meat quality is not significantly affected by sex (Table 18).

2.7 Performance by sire line

The following description shows the results of Tables 11 to 14 for the Genesus Duroc, Magnus, Talent and Tempo sire lines. It specifically addresses the significant differences observed between sire lines.

Live animal performances

Table 11 shows the overall live animal performances of the four sire lines. During the nursery period, a faster growth of the Genesus Duroc was observed as compared with the Talent with a weight 2.46 kg higher at the beginning of the finishing period. During the finishing period, the Magnus showed an ADG 42.60 g/day higher and a trial duration 2.47 days lower as compared with the Talent. The combination of these two growth periods resulted in a final age 4.58 days and 4.18 days lower respectively for the Genesus Duroc and the Magnus as compared with the Talent. The targeted slaughter weight of 130 kg was achieved and no significant difference was observed for the off-test weight between sire lines.

For feed consumption performances, the Magnus, Talent and Tempo sire lines showed higher feed efficiency than the Genesus Duroc line. This result was translated into a total consumption and a liveweight gain FC lower for the Magnus, Talent and Tempo sire lines for the period. The daily consumption was higher for the Genesus Duroc as compared with the Talent and the Tempo as well as for the Magnus as compared with the Talent.

Carcass quality

For carcass quality, in Table 11, a lower pre-slaughter backfat thickness, measured with ultrasound, was observed for the Talent vs. the Magnus and the Genesus Duroc, of 2.03 mm and 3.13 mm respectively, and 2.45 mm lower for the Tempo vs. the Genesus Duroc. The results of the measurement taken by the Destron probe in the slaughterhouse showed a lower backfat thickness for the Talent and Tempo sire lines as compared with the Genesus Duroc and Magnus sire lines. No difference in muscle depth was observed between sire lines for the ultrasound measurement and that of the Destron probe. The predicted lean yield showed the same significant differences as those of the backfat thickness (Destron). The lean yield of the Talent was higher than the Genesus Duroc and the Magnus by 1.48% and 1.15% respectively, whereas that of the Tempo was higher than the Genesus Duroc and the Magnus by 1.24% and 0.92% respectively. However, no difference in grading index was observed between sire lines based on all carcasses in the right weight range (92.5 to 114.4 kg) and the "Porc Qualité Québec" grading grid in effect during the slaughters.

In Table 13, the results in primal cuts showed, although no difference in muscle depth (Destron and ultrasound) was observed, a loin eye surface 3.15 cm^2 bigger for the Talent as compared with the Genesus Duroc. The Talent also showed higher reconstituted half carcass and leg weights than those of the Genesus Duroc and the Magnus. The Tempo had a higher leg weight than the Genesus Duroc. For the yields of primal cuts corresponding to the ratio between the cut weight and the reconstituted half carcass weight, the Talent showed a higher leg yield than the other three sire lines, while that of the Tempo was higher than the Genesus Duroc. In addition, the Magnus showed a higher shoulder yield than the Talent.

Performance by phase

More specifically, concerning the measurements taken upon feed change weighings (50, 75 and 100 kg; Table 12), a lighter weight was observed for the Talent at 100 kg as compared with the Genesus Duroc and the Magnus, by 2.39 kg and 2.50 kg respectively. Backfat (ultrasound) at 100 kg shows the same significant differences as those at 130 kg. As for the performance by phase (30-50 kg, 50-75 kg, 75-100 kg and 100-130 kg), the significant differences observed were in line with those of the overall phase (30-130 kg), meaning for daily consumption, ADG and FC.

Meat quality

Table 14 presents meat quality traits for loin and ham. On the one hand, for loin, the Genesus Duroc produced a darker meat (Japanese scale) than the Talent, greater meat firmness than the Magnus and the Tempo, as well as a water loss 1.17% lower compared with the Tempo. Besides, the Genesus Duroc and the Magnus showed greater marbling on the NPPC scale than the Talent and the Tempo. On the other hand, for ham, the Talent had a lower pH than the Tempo. Higher luminosity for the Talent was observed as compared with the Genesus Duroc. The Genesus Duroc showed a darker colour on the Japanese scale than that of the Magnus and the Talent, whereas the colour of the Tempo was darker than that of the Talent. These results on ham were translated into a predicted technological yield 0.81% lower for the Tempo as compared with the Magnus.

Conclusion

The overall performance of station-tested pigs is judged satisfactory, considering that live animal performances were excellent and carcass and meat quality was not irregular. The health conditions for these two trials were relatively good, except the acclimation phase of Trial 33, where the mortality rate was slightly higher than what was recorded in previous station trials. These overall results suggest that the station conditions allowed the animals to express their genetic potential properly.

These trials at the Deschambault swine testing station clearly demonstrated the differences in genetic potential between the four sire lines assessed. Significant differences in performance between sire lines were observed at all levels, namely live animal performances, carcass quality and meat quality. These results can be used to inform the Quebec pig value chain and the participating organizations on the genetic potential of these four sire lines and the differences in performance observed. A better knowledge of the genetic potential of sire lines contributes to better define the selection objectives and needs of the different markets to eventually improve the profitability of Quebec's pig industry.

Table 1 Program of preventive medication in feed during the acclimation period (Trial 32 and 33)

Feed	Medication	Antibiotic content	Duration (d)	Medications (g/pig)	Costs ($/pig[5])
Phase 1	Chlortetracycline[1] Tiamulin[2]	110 mg/kg 31 mg/kg	12	0.25	$0.04
Phase 2	Non medicated	---	7	---	---
Phase 3	Trimethoprim sulfa[3]	450 mg/kg	12	5.45	$0.87
Phase 4	Tylosin[4]	44 mg/kg	21	0.64	$0.12
		Trial 32 total	**52**	**6.34**	**$1.03**
Phase 1	Chlortetracycline[1] Tiamulin[2]	110 mg/kg 31 mg/kg	9	0.19	$0.03
Phase 2	Non medicated	---	7	---	---
Phase 3	Trimethoprim sulfa[3]	450 mg/kg	11	5.00	$0.80
Phase 4	Tylosin[4]	44 mg/kg	22	0.67	$0.13
		Trial 33 total	**49**	**5.86**	**$0.96**

[1] Auréomycine 220® by Alpharma

[2] Denagard® by Novartis

[3] Uniprim® by Bio-Agri-Mix

[4] Tylan 40® by Elanco

[5] CDMV price excluding taxes

Table 2 Program of preventive medication in water (H_2O) and by injection (Inj.) during the acclimation period (Trials 32 and 33)

Path way	Medication	Antibiotic content	Weight (kg)	Dosage (mg/kg)	Duration (d)	Medication (g/pig)	Cost ($/pig[6])
H_2O	Tiamulin[1]	100 mg/L	4.93	30.43	5	0.75	0.53
Inj.	Circovirus vaccine[2]	1 dose	19.5	---	1	1.00	1.80
Inj.	Doramectin[3]	10 mg/ml	12.0	0.58	1	0.01	0.27
Inj.	Mycoplasma vaccine[4]	1 dose	21.0	---	1	2.00	0.38
H_2O	Proliferative enteropathy vaccine[6]	1 dose	30.0	---	1	1.00	1.77
	Trial 32 total				**9**	**4.76**	**4.98**
H_2O	Tiamulin[1]	100 mg/L	5.07	29.59	5	0.75	0.53
Inj.	Circovirus vaccine[2]	1 dose	9.5	---	1	1.00	1.80
Inj.	Doramectin[3]	10 mg/ml	15.0	0.53	1	0.01	0.24
Inj.	Mycoplasma vaccine[4]	1 dose	18.0	---	1	2.00	0.38
H_2O	Proliferative enteropathy vaccine[5]	1 dose	32.0	---	1	1.00	1.77
	Trial 33 total				**11**	**5.06**	**5.22**

1 Denagard® by Novartis

2 Circoflex® by Boehringer

3 Dectomax® by Pfizer

4 M+Pac® by Boehringer

5 Enterisol Ileitis by Boehringer

6 CDMV price excluding taxes

Table 3 Curative medication used in pigs from Trials 32 and 33

Pathway	Medication	Posology	Weight (kg)	Dosage (mg/kg)	Length (d)	Medication (g/10 kg)	Costs ($/10 kg[13])
Inj.	Ceftiofur (RTU) [1]	50 mg/ml	10	7.5	3	0.225	7.00
Inj.	Tylosin[2]	200 mg/ml	10	8	3	0.24	0.21
Inj.	Penicillin[3]	300 mg/ml	10	45	4	1.8	0.32
Inj.	Dexamethasone[4]	2 mg/ml	10	0.133	5	0.007	0.41
Inj.	Tulathromycin[5]	100 mg/ml	10	2.5	1	0.025	1.06
Inj.	Ceftiofur[6]	100 mg/ml	10	5	1	0.05	0.56
Inj.	Trimethoprim sulfa[7]	240 mg/ml	10	16	4	0.64	0.26
Inj.	Trimethoprim sulfa[8]	240 mg/ml	10	16	4	0.64	0.26
H_2O	Trimethoprim sulfa[9]	660 mg/L	10	66	5	3.3	0.17
H_2O	Tylvalosin[10]	50 mg/L	10	5	5	0.25	0.09

[1] Excenel RTU® by Pfizer

[2] Tylan 200® by Elanco

[3] Depocillin® by Intervet

[4] Dexamethasone 2® by Vétoquinol

[5] Draxxin® by Pfizer

[6] Excede 100® by Pfizer

[7] Dofatrim-Ject® by Rafter 8

[8] Trimidox® by Vétoquinol

[9] 200-130 330G Formula by Bond et Beaulac (trial 32) / Trim-sulfa 660G by Demeter (trial 33)

[10] Aivlosin® by Pharmgate

[11] CDMV price excluding taxes

Table 4 Piglet performance during the acclimation period of Trials 32-33

Feeding phase	Number of piglets	Age (days)	Duration (days)	Weight (kg)	ADG (g/day)	Feed (kg)	Feed intake (kg)		Feed conversion
							/day	/piglet	
1	704	12.9 to 22.9	10.0	5.0 to 6.0	98	713	0.101	1.01	1.03
2	697	22.9 to 30.4	7.5	6.0 to 7.5	199	1 568	0.301	2.25	1.51
3	693	30.4 to 41.9	11.5	7.5 to 13.2	492	4 810	0.605	6.94	1.23
4	687	41.9 to 68.4	26.5	13.2 to 29.7	617	17 477	0.972	25.44	1.58
Overall	704	13.2 to 68.4	55.5	5.0 to 29.7	438	24 568	0.644	34.90	1.47

Table 5 Individual treatment reasons during acclimation and test periods

	Trial 32		Trial 33	
Reasons for treatement[1]	**Acclimation**	**Test**	**Acclimation**	**Test**
Overall poor condition	105	7	5	14
Locomotor problems	8	17	5	111
Digestive problems	1	0	8	28
Respiratory problems	22	3	0	1
Nervous system problems	15	6	10	3
Other conditions	22	15	1	2
Total number of piglets treated	**173**	**48**	**29**	**159**

[1] A piglet may have been treated several times for different causes.

Table 6 Treatments administered to pigs from Trials 32 (n = 352) and 33 (n = 352) during the acclimation period (A) and test period (T)

Local	Administration (justification)	AD[1] (n)	DT[2] (n)	IU[3] (%)	Medications[4] (g/pig)	Costs[5] ($/pig)
A	Feed (preventive)	18 697	15 501	82.91	6.35	1.04
A	Water (preventive)	18 697	1 760	9.42	0.75	0.54
A	Injectable (preventive)	18 697	1 003	5.36	3.01	2.18
A	Injectable (curative)	18 697	263	1.41	0.20	0.43
A	Water (curative)	18 697	1 660	8.88	5.94	0.26
T	Water (preventive)	31 543	326	1.03	1.01	1.79
T	Injectable (curative)	31 543	182	0.58	0.93	0.46
A - T	**Total for trial 32**	**50 240**	**20 695**	**109.59**	**18.19**	**6.70**
A	Feed (preventive)	19 481	14 630	75.10	5.89	0.96
A	Water (preventive)	19 481	1 760	9.03	0.76	0.53
A	Injectable (preventive)	19 481	1 041	5.34	3.00	2.45
A	Injectable (curative)	19 481	83	0.43	0.11	0.05
T	Water (preventive)	31 576	344	1.09	1.01	1.78
T	Water (curative)	31 576	3 420	10.83	26.03	1.79
T	Injectable (curative)	31 576	551	1.74	2.68	1.57
A - T	**Total for trial 33**	**51 057**	**21 829**	**103.56**	**39.48**	**9.13**

[1] Animal-days (AD). This indicator represents the cumulative number of animals present every day in the nursery and in the grow-finish phase (E.g. D1 = 50 animals, D2 = 50 animals, D3 = 49 animals, Total AD = 149 animals).

[2] Number of therapeutic doses administered (TD). This indicator is equivalent to the number of "AD in treatment."

[3] Intensity of use (IU). This indicator represents the ratio between TD and AD.

[4] Sum of medication consumed in the premise / average number of pigs in the premise (for the acclimation phase or the testing period before the first batch of pigs was slaughtered).

[5] Sum of the costs of each treatment on the premises / Final number of pigs on the premises (for the acclimation phase or the test period before the first batch of pigs was slaughtered).

Table 7 Causes of mortality

	Trial 32		Trial 33	
	Acclimation	**Test**	**Acclimation**	**Test**
Poor condition[1]	0	0	0	0
Wasting	3	2	0	1
Locomotor problems	0	3	0	2
Nervous syst. problems	0	0	0	0
Respiratory problems	10	0	0	0
Sudden death	4	1	4	0
Meningitis	7	1	4	0
Other conditions	0	3	0	3
Total number (%)	**24/352 (6.8)**	**10/328 (3.0)**	**8/352 (2.3)**	**6/344 (1.7)**

[1] Piglets in poor condition upon arrival at the testing station (0-3 day(s))

Table 8 Serological controls at the end of test periods

	Trial 32		Trial 33	
	Number of pigs tested	**Number of positives**	**Number of pigs tested**	**Number of positives**
PRRS virus[1]	20	20	20	0
Pleuropneumonia (multi)[2]	20	1	20	0
Mycoplasma hyopneumoniae[3]	20	4 (3 positives and 1 suspected)	20	15 (8 positives and 7 suspected)

[1] Test ELISA IDEXX (Laboratoire FMV)

[2] Test ELISA App multi (*Actinobacillus pleuropneumoniae*, all sérotypes) (Laboratoire FMV)

[3] Test ELISA DAKO (Laboratoire FMV)

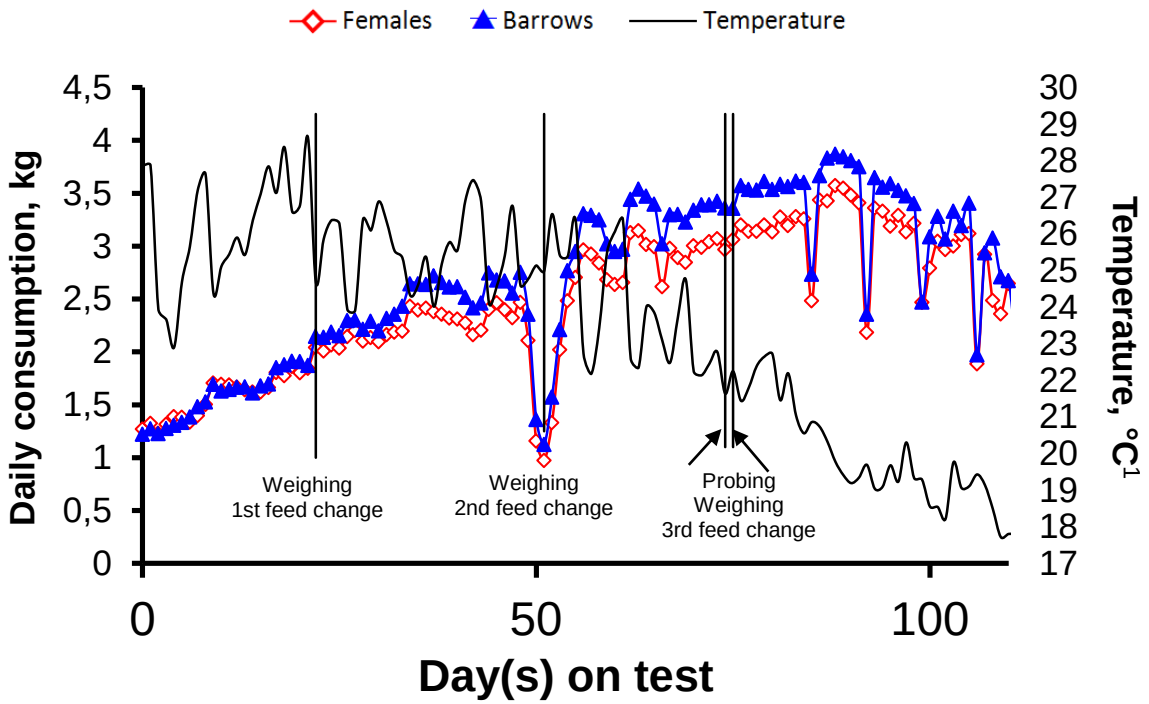
Table 9 Distribution of sires, litters, herds and sexes by sire line[1]

	Genesus	**Magnus**	**Talent**	**Tempo**
Number of sires used	17	23	15	19
Number of litters	44	46	45	43
Number of herds	12	12	11	11
Number of barrows	75	77	77	78
Number of females	90	85	86	84

[1] For the number of piglets entered into the station and for which data were used in analysis

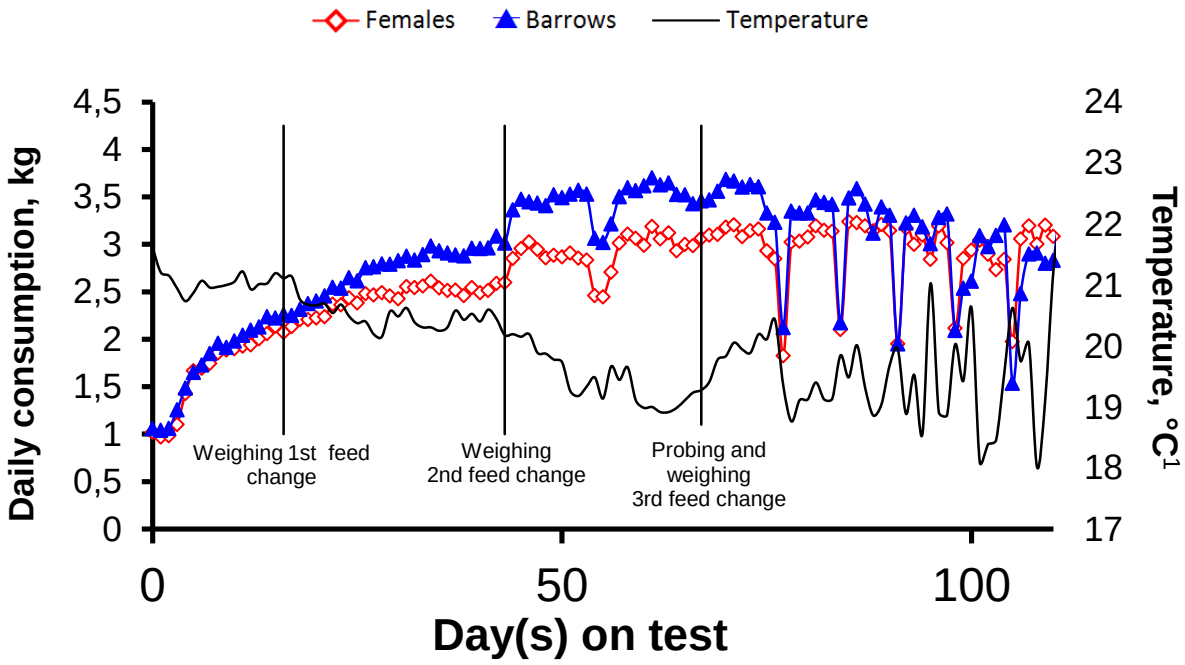
Table 10 Feeding behaviour data

	Total duration of visits / pig/ day(min	Number of visits/pig/day	Average meal size (g) of pigs	Rate of ingestion (g/min)	Average duration of visits (min)	% of time the feeder was busy prior to the first slaughter	% of total visit time occurring when light is on	% of total visit time occurring from 4:45am to 9:00pm
All								
Overall	57.1	16.9	211.3	52.5	4.4	48.7	56.0	83.7
30-45 kg	61.1	18.1	114.2	31.3	4.3	50.4	50.0	80.4
45-75 kg	62.8	20.2	156.2	44.7	4.1	51.9	52.2	81.4
75-100 kg	56.2	16.7	232.3	59.3	4.3	46.2	56.4	84.4
100-130 kg	49.2	12.9	316.6	68.9	4.9	42.9	61.7	86.8
Barrows								
Overall	60.5	16.6	224.2	51.7	4.7	52.4	53.0	82.1
30-45 kg	62.7	17.9	116.5	31.0	4.4	52.8	48.9	80.0
45-75 kg	66.7	19.4	169.9	43.5	4.4	56.5	49.3	79.9
75-100 kg	60.0	16.1	258.8	59.8	4.7	50.3	52.8	82.4
100-130 kg	52.1	12.9	334.8	68.8	5.2	46.1	58.4	84.8
Females								
Overall	54.3	17.2	200.6	53.1	4.1	45.5	58.5	85.1
30-45 kg	59.8	18.3	112.3	31.5	4.2	48.3	51.0	80.8
45-75 kg	59.5	20.8	144.3	45.8	3.8	48.1	54.7	82.6
75-100 kg	52.7	17.3	207.6	58.9	3.8	42.5	59.7	86.2
100-130 kg	47.1	12.8	303.8	69.0	4.7	40.1	64.2	88.2



[1] Average calculated temperature = the average of minimum and maximum temperatures

Figure 1 **Evolution of the average daily consumption and temperature during Trial 32**



[1] Average calculated temperature = the average of minimum and maximum temperatures

Figure 2 **Evolution of the average daily consumption and temperature during Trial 33**

Table 11 Effect of sire line on live animal performances

Variables	N	Overall	Sire line					
			Genesus	Magnus	Talent	Tempo	Standard error of difference	Prob.
Growth performance								
Off test age, d	649	163.11	161.39 B	161.80 B	165.97 A	163.27 AB	0.97	0.000
Trial duration, d	652	95.11	94.90 AB	93.99 B	96.47 A	95.08 AB	0.87	0.043
On-test weight, kg	649	29.60	30.77 A	29.70 AB	28.31 B	29.61 AB	0.63	0.004
Off-test weight, kg	652	129.65	130.14 A	130.33 A	128.44 A	129.69 A	37.12*	0.414
ADG, g/d	652	1063.04	1067.34 AB	1080.95 A	1038.35 B	1065.52 AB	12.09	0.008
Pre-slaughter backfat (Ultrasound), mm	652	16.42	18.14 A	17.03 AB	15.01 C	15.68 BC	0.03**	0.000
Pre-slaughter lean depth (Ultrasound), mm	652	67.23	66.96 A	67.42 A	67.67 A	66.90 A	0.53	0.413
Feed intake performance								
Total feed intake, kg	619	252.96	260.17 A	251.40 B	249.56 B	250.70 B	2.53	0.000
Daily feed intake, kg/d	619	2.68	2.78 A	2.70 AB	2.58 C	2.65 BC	0.03	0.000
Feed conversion	619	2.54	2.61 A	2.52 B	2.51 B	2.51 B	0.03	0.000
Carcass yield								
Hot carcass weight, kg	647	104.52	104.35 A	104.43 A	104.82 A	104.48 A	0.22	0.157
Carcass yield, %	651	80.58	80.47 A	80.44 A	80.86 A	80.57 A	25.33*	0.125
Backfat (Destron) (mm)	638	18.85	20.54 A	19.86 A	17.41 B	17.78 B	0.03**	0.000
Lean depth (Destron) (mm)	636	68.43	67.13 A	68.15 A	69.66 A	68.76 A	1.02	0.151
Lean yield, %	637	60.78	60.01 B	60.34 B	61.49 A	61.25 A	31.06****	0.000
Index (Quebec grading grid)	624	112.38	112.01 A	112.84 A	112.37 A	112.30 A	0.38	0.187

* Standard error and probabilities obtained on data transformed by rank.
** Standard error and probabilities obtained on data transformed by natural log.
**** Standard error and probabilities obtained on data transformed by square elevation.

Table 12 Effect of sire line on performances by phase

Variables	N	Overall	Sire line					
			Genesus	Magnus	Talent	Tempo	Standard error of difference	Prob.
Growth performance								
On-test weight (kg)	649	29.60	30.77 A	29.70 AB	28.31 B	29.61 AB	0.63	0.004
Weight at first feed change (kg)	652	46.60	47.01 A	46.60 A	46.39 A	46.41 A	0.30	0.162
Weight at second feed change (kg)	652	75.70	76.42 A	75.97 A	74.69 A	75.71 A	0.85	0.377
Weight at third feed change (kg)	652	102.65	103.40 A	103.51 A	101.01 B	102.67 AB	0.81	0.013
Off-test weight (kg)	652	129.65	130.14 A	130.33 A	128.44 A	129.69 A	37.12*	0.414
Backfat 100 kg (mm)	652	13.56	14.68 A	13.97 AB	12.65 C	13.02 BC	0.03**	0.000
Pre-slaughter backfat (mm)	652	16.42	18.14 A	17.03 AB	15.01 C	15.68 BC	0.03**	0.000
Lean depth 100 kg (mm)	651	61.57	61.54 A	61.80 A	61.80 A	61.13 A	0.59	0.628
Pre-slaughter lean depth (mm)	652	67.23	66.96 A	67.42 A	67.67 A	66.90 A	0.53	0.413
Performance by period								
Daily feed intake phase 1 (kg/day)	641	1.65	1.73 A	1.63 B	1.64 B	1.62 B	0.03	0.000
Daily feed intake phase 2 (kg/day)	640	2.45	2.56 A	2.45 A	2.34 A	2.45 A	0.06	0.101
Daily feed intake phase 3 (kg/day)	640	3.03	3.14 A	3.08 AB	2.90 C	3.01 BC	0.04	0.000
Daily feed intake phase 4 (kg/day)	652	3.44	3.52 A	3.54 A	3.31 B	3.41 AB	0.06	0.001
ADG phase 1 (g/day)	650	946.72	968.30 A	944.46 A	934.47 A	939.65 A	16.78	0.225
ADG phase 2 (g/day)	650	1040.80	1051.02 A	1052.60 A	1010.55 A	1049.00 A	24.80	0.388
ADG phase 3 (g/day)	650	1125.11	1130.11 A	1147.01 A	1107.58 A	1115.75 A	17.40	0.101
ADG phase 4 (g/day)	649	1134.57	1112.02 AB	1175.42 A	1101.26 B	1149.58 AB	25.16	0.012
Feed conversion Phase 1 (g/day)	637	1.75	1.80 A	1.73 A	1.75 A	1.73 A	0.02**	0.059
Feed conversion Phase 2 (g/day)	638	2.34	2.41 A	2.31 A	2.31 A	2.33 A	0.02**	0.360
Feed conversion Phase 3 (g/day)	639	2.69	2.77 A	2.68 A	2.65 A	2.68 A	0.02**	0.241
Feed conversion Phase 4 (g/day)	645	3.05	3.15 A	3.03 AB	3.03 AB	2.98 B	0.01**	0.006

* Standard error and probabilities obtained on data transformed by rank.
** Standard error and probabilities obtained on data transformed by natural log.

Table 13 Effect of sire line on carcass quality

Variables	N	Overall	Sire line					
			Genesus	Magnus	Talent	Tempo	Standard error of difference	Prob.
Primal cuts								
Reconstituted half carc. (kg)	648	45.34	45.16 B	45.21 B	45.59 A	45.39 AB	9.70****	0.001
Loin eye area (cm²)	651	51.47	50.14 B	50.94 AB	53.29 A	51.50 AB	0.90	0.010
Carcass length (cm)	647	85.23	84.97 A	85.26 A	85.25 A	85.46 A	0.34	0.544
Leg weight (kg)	649	11.90	11.68 C	11.77 BC	12.19 A	11.95 AB	0.01**	0.000
Loin weight (kg)	649	12.77	12.83 A	12.70 A	12.84 A	12.72 A	0.08	0.238
Shoulder weight (kg)	650	12.30	12.29 A	12.40 A	12.23 A	12.28 A	0.07	0.139
Belly weight (kg)	651	8.31	8.33 A	8.27 A	8.27 A	8.39 A	0.15	0.837
Leg yield (%)	648	26.30	25.90 C	26.09 BC	26.81 A	26.38 B	0.15	0.000
Loin yield (%)	648	28.19	28.42 A	28.15 A	28.13 A	28.04 A	0.18	0.192
Shoulder yield (%)	647	27.16	27.23 AB	27.43 A	26.88 B	27.09 AB	0.16	0.006
Belly yield (%)	648	18.35	18.45 A	18.31 A	18.14 A	18.49 A	0.35	0.767

** Standard error and probabilities obtained on data transformed by natural log.
**** Standard error and probabilities obtained on data transformed by square elevation.

Table 14 Effect of sire line on meat quality

Variables	N	Overall	Sire line					
			Genesus	Magus	Talent	Tempo	Standard error of difference	Prob.
Loin								
pH (24 hours)	652	5.60	5.62 A	5.60 A	5.57 A	5.60 A	24.82*	0.166
Luminosity	652	50.84	50.45 A	51.12 A	51.13 A	50.64 A	28.40*	0.244
Color (jap.)	652	3.51	3.65 A	3.48 AB	3.42 B	3.50 AB	0.08	0.033
Marbling (NPPC)	652	2.54	2.89 A	2.76 A	2.23 B	2.31 B	0.04***	0.000
Firmness (1=soft, 3=firm)	652	2.46	2.69 A	2.43 B	2.47 AB	2.26 B	0.09	0.000
Drip loss (%)	651	3.47	2.87 B	3.40 AB	3.62 AB	4.04 A	0.09***	0.006
Ham								
pH (24 hours)	650	5.59	5.59 AB	5.59 AB	5.55 B	5.61 A	0.00**	0.003
Luminosity	651	52.80	52.10 B	53.15 AB	53.60 A	52.34 AB	0.46	0.006
Color (jap.)	649	3.60	3.75 A	3.53 BC	3.47 C	3.66 AB	0.06	0.000
Bicolour index	647	1.62	1.57 A	1.61 A	1.71 A	1.59 A	0.07	0.200
Technical yield (%)	645	126.75	126.84 AB	127.22 A	126.55 AB	126.41 B	0.24	0.004

* Standard error and probabilities obtained on data transformed by rank.
** Standard error and probabilities obtained on data transformed by natural log.
*** Standard error and probabilities obtained on data transformed by square root.

Table 15 Effect of sex on live animal performances and covariables used

Variables	N	Overall	Sex				Prob. line x sex	Covariables used*
			Barrows	Females	Diff.	Prob.		
Growth performance								
Off-test age, d	649	163.11	159.92	166.30	6.37	0.000	0.753	
Trial duration, d	652	95.11	92.35	97.87	5.51	0.000	0.878	Otw
On-test weight, kg	649	29.60	29.90	29.30	(0.61)	0.022	0.615	Ae
Off-test weight, kg	652	129.65	129.65	129.66	0.01	0.394	0.966	
ADG, g/d	652	1063.04	1 093.91	1 032.17	(61.73)	0.000	0.886	Otw
Pre-slaughter backfat (Ultrasound), mm	652	16.42	18.16	14.85	(3.31)	0.000	0.870	Sw
Pre-slaughter lean depth (Ultrasound), mm	652	67.23	66.58	67.89	1.31	0.000	0.874	Sw
Feed intake performance								
Total feed intake, kg	619	252.96	257.40	248.52	(8.88)	0.000	0.321	Otw, Fw
Daily feed intake, kg/day	619	2.68	2.80	2.55	(0.25)	0.000	0.537	Otw
Feed conversion	619	2.54	2.58	2.49	(0.09)	0.000	0.345	Otw
Carcass yield								
Hot carcass weight, kg	647	104.52	104.54	104.50	(0.03)	0.828	0.595	Fw
Carcass yield, %	651	80.58	80.59	80.58	(0.02)	0.716	0.398	
Backfat (Destron) (mm)	638	18.85	20.63	17.23	(3.40)	0.000	0.592	Fw
Lean depth (Destron) (mm)	636	68.43	67.38	69.47	2.10	0.012	0.972	Fw
Lean yield, %	637	60.78	59.99	61.55	1.56	0.000	0.620	Fw
Index (Quebec slaughter grid)	624	112.38	112.44	112.32	(0.12)	0.628	0.000	

* Covariables: Ae=Age at entry, Otw=On-test weight, Sw=Sampling weight, Fw=Final (off-test) weight

Table 16 Effect of sex on performances by phase and covariables used

Variables	N	Overall	Sex				Prob. line x sex	Covariables used*
			Barrows	Females	Diff.	Prob.		
Growth performance								
On-test weight (kg)	649	29.60	29.90	29.30	(0.61)	0.022	0.615	Ae
Weight at first feed change (kg)	652	46.60	46.82	46.39	(0.43)	0.040	0.804	Otw
Weight at second feed change (kg)	652	75.70	76.86	74.53	(2.33)	0.000	0.676	Otw
Weight at third feed change (kg)	652	102.65	105.13	100.17	(4.96)	0.000	0.937	Otw
Off-test weight (kg)	652	129.65	129.65	129.66	0.01	0.394	0.966	
Backfat 100 kg (mm)	652	13.56	14.64	12.55	(2.09)	0.000	0.416	Sw
Pre-slaughter backfat (mm)	652	16.42	18.16	14.85	(3.31)	0.000	0.870	Sw
Lean depth 100 kg (mm)	651	61.57	60.89	62.25	1.36	0.000	0.695	Sw
Pre-slaughter lean depth (mm)	652	67.23	66.58	67.89	1.31	0.000	0.874	Sw
Performance by period								
Daily feed intake Phase 1 (kg/day)	641	1.65	1.68	1.63	(0.04)	0.018	0.317	Otw
Daily feed intake Phase 2 (kg/day)	640	2.45	2.57	2.32	(0.25)	0.000	0.026	Otw
Daily feed intake Phase 3 (kg/day)	640	3.03	3.25	2.82	(0.43)	0.000	0.473	Otw
Daily feed intake Phase 4 (kg/day)	652	3.44	3.64	3.25	(0.39)	0.000	0.633	Otw
ADG phase 1 (g/day)	650	946.72	961.61	931.83	(29.79)	0.030	0.675	Otw
ADG phase 2 (g/day)	650	1040.80	1 076.07	1 005.52	(70.55)	0.000	0.295	Otw
ADG phase 3 (g/day)	650	1125.11	1 179.52	1 070.71	(108.80)	0.000	0.683	Otw
ADG phase 4 (g/day)	649	1134.57	1 157.76	1 111.38	(46.37)	0.006	0.801	Otw
Feed conversion Phase 1 (g/day)	637	1.75	1.74	1.76	0.01	0.436	0.222	Otw
Feed conversion Phase 2 (g/day)	638	2.34	2.39	2.30	(0.09)	0.000	0.478	Otw
Feed conversion Phase 3 (g/day)	639	2.69	2.76	2.63	(0.14)	0.000	0.294	Otw
Feed conversion Phase 4 (g/day)	645	3.05	3.16	2.94	(0.22)	0.000	0.436	Otw

* Covariables: Ae=Age at entry, Otw=On-test weight, Sw=Sampling weight, Fw=Final (off-test) weight

Table 17 Effect of sex on carcass quality and covariables used

Variables	N	Overall	Sex				Prob. line x sex	Covariables used*
			Barrows	Females	Diff.	Prob.		
Primal cuts								
Reconstituted half carc. (kg)	648	45.34	45.22	45.45	0.23	0.002	0.286	Fw
Loin eye area (cm²)	651	51.47	49.48	53.46	3.98	0.000	0.618	Fw
Carcass length (cm)	647	85.23	84.83	85.63	0.80	0.000	0.146	Fw
Leg weight (kg)	649	11.90	11.74	12.06	0.32	0.000	0.320	Fw
Loin weight (kg)	649	12.77	12.80	12.75	(0.05)	0.284	0.560	Fw
Shoulder weight (kg)	650	12.30	12.32	12.28	(0.04)	0.358	0.829	Fw
Belly weight (kg)	651	8.31	8.31	8.32	0.01	0.852	0.708	Fw
Leg yield (%)	648	26.30	26.00	26.59	0.58	0.000	0.092	
Loin yield (%)	648	28.19	28.31	28.06	(0.25)	0.004	0.766	
Shoulder yield (%)	647	27.16	27.27	27.05	(0.22)	0.010	0.864	
Belly yield (%)	648	18.35	18.39	18.30	(0.08)	0.232	0.885	

* Covariables: Fw=Final (off-test) weight

Table 18 Effect of sex on meat quality and covariables used

Variables	N	Overall	Sex				Prob. line x sex
			Barrows	Females	Diff.	Prob.	
Loin							
pH (24 hours)	652	5.60	5.60	5.59	(0.01)	0.503	0.790
Luminosity	652	50.84	50.97	50.70	(0.27)	0.124	0.064
Color (jap.)	652	3.51	3.53	3.50	(0.03)	0.507	0.029
Marbling (NPPC)	652	2.54	2.70	2.38	(0.32)	0.000	0.265
Texture (1=soft, 3=firm)	652	2.46	2.47	2.45	(0.02)	0.758	0.832
Drip loss (%)	651	3.47	3.54	3.40	(0.15)	0.406	0.865
Ham							
pH (24 hours)	650	5.59	5.59	5.58	(0.01)	0.077	0.793
Luminosity	651	52.80	52.84	52.75	(0.09)	0.697	0.192
Color (jap.)	649	3.60	3.63	3.58	(0.05)	0.118	0.420
Bicolour index	647	1.62	1.62	1.62	(0.00)	0.929	0.970
Technical yield (%)	645	126.75	126.70	126.80	0.10	0.538	0.417

Appendix 1

Appendix 1

Definition of variables

Variables	Abbreviations (units)	Description
Nursery-Growth Performance		
Age	Age (d)	Age at the beginning and at the end of the period.
Duration	Duration (d)	End date – start date of the period.
Weight	Weight (kg)	Weight at the beginning and at the end of the period.
Average daily gain	ADG (g/d)	Final weight – initial weight/number of piglet days. For the overall period and for each of the feeding phases.
Total feed consumption	Feed(kg)	Total quantity of feed consumed for all piglets during the period. For the overall period and for each of the feeding phases.
Daily feed intake*	Feed intake/day (kg/d)	Feed intake per piglet per day. For the overall period and for each of the feeding phases.
Feed intake per piglet*	Feed intake/piglet (kg/piglet)	Total feed intake per piglet. For the overall period and for each of the feeding phases.
Feed conversion on live weight gain*	F.C. live weight gain	Overall feed intake for all pens/live weight gain for all piglets. For the overall period and for each of the feeding phases.

* Feed intake in the nursery was measured for all piglets and not on an individual basis.

Test-Growth performance		
Age at the beginning of the trial	Age at the beginning of the trial	Age at the beginning of the trial
Age at the end of the trial	Age at the end of the trial	Age at the end of the trial
Duration of trial	Duration of trial	Duration of trial
Weight at the beginning of the trial	Weight at the beginning of the trial	Weight at the beginning of the trial
Weight at the end of the trial	Weight at the end of the trial	Weight at the end of the trial
Average daily gain	Average daily gain	Average daily gain
Repeated measures	Repeated measures	Repeated measures
Backfat thickness	Backfat (mm)	Backfat thickness measurement between 3rd and 4th last ribs on the live animal Frequency: at 100 kg and prior to shipment to the slaughterhouse. Ultrasound machine in B mode
Lean depth	Lean depth (mm)	Loin depth measurement between 3rd and 4th last ribs on the live animal Frequency: at 100kg and prior to shipment to the slaughterhouse. Ultrasound machine in B mode

Feed efficiency performance		
Total feed intake per pig	Total feed intake per pig	Total feed intake per pig
Daily feed intake per pig	Daily feed intake per pig	Daily feed intake per pig
Feed conversion on live weight gain	Feed conversion on live weight gain	Feed conversion on live weight gain

Variables	Abbreviations (units)	Description
Carcass yield		
Hot carcass weight	Hot weight (kg)	Hot carcass weight after exsanguination and evisceration with head, tongue, leaf fat, kidneys, jowl, feet and no trimmings
Carcass yield	Carcass yield (%)	(Hot carcass weight/Live weight at the end of the trial) x 100
Grading index (desired stratum)	Average index	Average index of carcasses that are in the desired stratum of defined weight according to the grading grid that is in effect
Lean yield	Lean yield (%)	Carcass lean yield calculated from the prediction equation established by Agriculture and Agri-Food Canada
Half-carcass length	Length (cm)	Measure from the cranial edge of the first rib to the anterior tip of the aitchbone (Foster's rule)

Primal cut		
Half-carcass weight	½ carcass weight recons. (kg)	Half carcass weight reconstituted from the 4 primal cuts: ham, loin, shoulder and belly; does not include legs.
Loin eye area	Loin eye area (cm^2)	Area measured from a digital photo and image J software
Ham weight	Ham weight (kg)	Cut perpendicular to the inferior part of the leg. Cut line at 4.5 cm (1 ¾ inch) from the anterior tip of the aitch bone. Without the hind feet and tail.
Loin weight	Loin weight (kg)	The loin is separated from the belly by a cut which, being at the extremity of the shoulder, starts at 4.5 cm (1 ¾ inch) from the base of the ribs, extends to 10cm (4 in) to the center of the loin and ends at the ham extremity while running alongside the tenderloin at 2 cm (3/4 inch)
Shoulder weight	Shoulder weight (kg)	The shoulder is separated from the loin and the belly by a cut that is perpendicular to the back and which passes through the centre of the 3rd rib.
Belly weight	Belly weight (kg)	See the description for the loin weight.
Short hip and ½ carcass ratio	Short hip yield (%)	(Ham weight / Half carcass weight) x 100
Loin and ½ carcass ratio	Loin Yield (%)	(Loin weight / Half carcass weight) x 100
Shoulder and ½ carcass ratio	Shoulder Yield (%)	(Shoulder weight / Half carcass weight) x 100
Belly and ½ carcass ratio	Belly yield (%)	(Belly weight / Half carcass weight) x 100

Variables	Abbreviations (units)	Description
Meat quality		
Loin: Measurse taken on the Longissimus dorsi muscle between the 3rd and the 4th last ribs, 24 hours after slaughter *Ham : Measures taken on theGluteus medius muscle 24 hours after slaughter*		
24 hr pH (loin and ham)	24hr pH	pH measurement at two (2) locations in the loin muscle using a pH meter, one measure is taken in the *gluteus medius* muscle of the ham.
Luminosity (loin and ham)	Luminosity	Reflectance measure taken at 2 spots on the loin muscle using a Minolta CR300 apparatus. One measure only is recorded on the ham in the *gluteus superficialis* muscle.
Visual colour score (loin and ham)	Colour	Scores determined by comparison to Meat Colour Samples from the Japanese Colour Scale (1 to 6). In the ham, scoring is made on the *gluteus superficialis* muscle
Visual Intramuscular Fat Score measured on the loin	Marbling	Measure of the marbling level according to the NPPC scale (1 to 10)
Loin firmness	Firmness	Subjective measurement performed by handling of meat assessed on a 1 to 3 scale (1: soft, 2: medium, 3: firm)
Loin drip loss	Drip loss (%)	Measure performed on a muscle tissue sample collected from the anterior portion of the loin and drip dried for 48 hours. (Water loss of muscle / fresh muscle weight) x 100
Technological yield of ham	Tech. yield (%)	Assessed from a predictive equation where colour and reflectance variables (L*, a* and b*) of leg muscles are used. Measurements were performed on the gluteus medius and gluteus profondus muscles.

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