Centre de développement du porc du Québec inc.

PROGRAM FOR EVALUATION OF PIGS AT THE DESCHAMBAULT TEST STATION SPECIFIC PROTOCOL FOR NOVEMBER 2007 AND MAY 2008 TRIALS (# 23 and 24) [1]

1. TITLE

Performances of commercial pigs bred from terminal lines of different genetic types

2. OBJECTIVE

The objective of this project is to measure, in a controlled and non-limiting environment, the growth performances, carcass and meat quality of commercial pigs bred from terminal boars representative of genetic lines available in Québec.

3. METHODOLOGY

3.1 Description

Different organizations working in Québec swine production will be able to evaluate simultaneously, at the Deschambault Test Station, the crossbred offspring produced from boars lines of their choice and Yorkshire-Landrace or Landrace-Yorkshire hybrid females. Different variables will be collected within this program: growth performance, individual feed intake, carcass quality, weight of primal cuts, as well as meat quality (see Appendix 1). Some quality meat data will be compared with the specifications indicated in the document *Quebec Market Reference* (2003) which describes the market needs.
http://www.cdpqinc.qc.ca/document/rapportréférence-version%20anglaise%20complete.pdf

The Deschambault Test Station is equipped with an individual feeding system that allows measurement of the feed intake of every pig. It records the hour and an accurate duration of every visit to the feeding trough. Taken on a continuous basis, these data will not only allow an evaluation of the real feed intake of the pigs, but will also study their feeding behaviour.

The commercial pigs will be tested during trials #23 and 24, namely the test taking place from November 2007 to May 2008, and the one from May to November 2008.

3.2 Terminal boars

A maximum of four (4) different terminal breeding lines will be evaluated simultaneously at the Deschambault Test Station (Table 1). A breeding line is defined as a group of individuals from the same race or the same genetic scheme, registered by different organizations. The participating organizations will have to detain boars in a Québec accredited artificial insemination centre. These terminal breeding lines will have to be available in a Québec artificial insemination centre at the time of registration. The CDPQ Board of Directors requires that artificial insemination centres not registered at the CDPQ's *Programme de gestion sanitaire des centres d'insémination artificielle* (PGSCIA) comply with minimal standards of PGSCIA.
http://www.cdpqinc.qc.ca/Champs_dactivite/04Sante/references/Programme_PGSCIA%20final%202006-2007.pdf

[1] This is a non official version of the trials # 23-24 protocol of Deschambault's test station. Please, note that French version will be considered as the only official version. We are not responsible for any mistake that may occur with the translation. Note as well that the registration form is only included in the French version at the end of the document.

If more than four (4) lines are to be tested, priority will be given according to the eligibility rules. These are detailed at Section 5 of this document. To carry out the matings, participating organizations will be asked to select **a minimum of fifteen (15) boars per breeding line (a maximum of 20).** The Centre de développement du porc du Québec inc. (CDPQ) reserves the right to eliminate certain of the selected boars, if needed, to facilitate the management of the collected semen. **The parents (sire and dam) of each boar must ideally be different from those of the other boars**, in order to best represent every breeding line. A total of eleven (11) non-related boars are required and only half-sibs will be accepted to complete the number of boars.

Moreover, participating organizations will need to have each of the selected boars tested with regard to their halothane and RN status. These tests will have to be done at the CDPQ's laboratory. Different boars of the same breeding line will thus be used uniformly, with the goal of obtaining one (1) to two (2) litters – or four (4) to eight (8) piglets – per boar. A maximum of four (4) matings per boar should be performed (this maximum could be lowered if the expected number of services is lower than 180, according to the participating herds).

Table 1: Terminal breeding line to be tested at the Deschambault Station

Terminal lines	Participating organizations

3.3 Sows

Crossbred females with a Yorkshire Landrace predominance will be used for these tests. Ideally, use of gilts should be avoided. The producer will have to provide the following data:

- ID number of the sow (ear-tag and/or tattoo);
- Genetic identification of the sow (commercial product);
- All information relative to services: date and time of insemination of every dose, semen ID number, identification of the person that carries out insemination;
- All information relative to the actual farrowing and to the piglet's identification.

3.4 Herds

Participating organizations agree to provide a list of the commercial herds that will be necessary to carry out the protocol. Ideally, **23 commercial herds** are required for services, namely **a minimum of five (5) herds per organization.**

3.4.1 Eligibility conditions for herds

Commercial producers may participate subject to the following conditions:

- They must raise a minimum of 300 productive sows and accept to deliver the requested number of piglets within the two (2) days of entry at the station;
- They must be able to demonstrate that the inseminated sows are genetically YL or LY;
- They must have adequate herd records in order to provide all information on services and litters of inseminated sows;

- At the time of the registration, the herd must have been followed-up since six (6) months by a veterinarian. The veterinarian responsible for this follow-up will provide information attesting the absence or effective control of the following illnesses :

    - Transmissible Gastroenteritis (TGE)
    - Porcine reproductive and respiratory syndrome (PRRS)
    - Enzootic pneumonia
    - Atrophic rhinitis
    - *Pleuropneumonia*
    - Dysentery
    - Sarcoptic mange
    - Exsudative epidermitis
    - Glasser's disease
    - Any *Streptococcus suis* pathology (meningitis, etc.).

This information must be provided to a veterinarian from CDPQ. The veterinarian will decide if the herd is accepted or will inform the herd of the reasons for exclusion.

- They must be accredited by the Canadian Quality Assurance (CQA®) program.
- Within the two weeks before the beginning of the test, the producer and the veterinarian responsible for the herd follow-up must testify to the absence, in the farrowing and nursery areas, of any clinical signs of detrimental illness, and more particularly of the following:

    - Transmissible Gastroenteritis (TGE)
    - Porcine reproductive and respiratory syndrome (PRRS)
    - Exsudative epidermitis
    - Glasser's disease
    - Any *Streptococcus suis* pathology (meningitis, etc.)
    - Atrophic rhinitis
    - *Pleuropneumonia*

Note: Chosen sow barns will ideally possess facilities, and will be managed with procedures, that allow for the efficient limitation of direct or indirect contact between newborn and older piglets (e.g. partitioned sow barn, all-in all-out production system, early weaning, etc.).

3.5 Services

In each of the 23 herds, services are under the responsibility of their respective producers. In every herd, services will be carried out with the semen of all boar lines tested, in order not to mix up the boar effect with the sow's origin effect. While about eight (8) sows will be mated per herd, the same terminal line will be used more than once in the same herd (Table 2). So as to ensure that all piglets enter the station within a short period, services must be performed within a five (5) days interval. Doses will be provided for free by the participating organizations and three (3) doses will be provided per sow.

In order to preserve anonymity of origin of the boars used for insemination, the CDPQ will assign a particular identification code to each boar.

The corresponding list of identifications will be forwarded to artificial insemination centres (AIC). No semen will be coloured. However, on every semen tube, a coloured label with the unique identification code will be affixed so that producers clearly differentiate the doses to be used. Doses inseminated to each female will be **homospermatic,** that is, containing semen from only one boar.

Participating producers will be responsible for ordering the semen from AIC for the services carried out between July 16 and 20, 2007, and between January 14 and 18, 2008 inclusively for both (2) station entries (see Appendix 2).

So as to insure the best supplying of piglets in quality and number, twice as many services than litters required will be performed (Table 2).

Table 2: Distribution of litters within herds and piglets sampling for station evaluation

Terminal boars	Sows	Average number of services per herd*	Total number of services **	Number of litters tested in station	Number of selected piglets / litter	Number of piglets entering the station
Line 1	48	2	48	20	4	80
Line 2	48	2	48	20	4	80
Line 3	48	2	48	20	4	80
Line 4	48	2	48	20	4	80
Total	192	8	192	80	16	320

*: Considering eight (8) serviced sows per herd
**: Considering that services are carried out in 24 herds

3.6 Piglets

3.6.1 Piglet selection

The producer or any person authorized within the same organization will carry out the final selection of piglets. However, this final piglet selection can only be done from the piglets pre-selected by CDPQ staff. Four (4) piglets will be selected per litter, namely **two (2) castrates and two (2) females.** Selected piglets must IMPERATIVELY be between 11 and 15 days old when entering the station (farrowing day being day 0) and weight a minimum of 3 kg. The piglets must not show any clinical sign of contagious illness, nor have any problems related to legs (arthritis) or hernia, and their castrating and tail cutting wounds must be properly healed.

3.6.2 Piglet identification

All piglets from selected litters must be identified at birth with tags provided by the CDPQ. The CPDQ commits itself to pre-identify the tags for every litter. The participating producers will be put in touch with CDPQ staff one week after farrowing, namely when piglets are between three (3) and nine (9) days old, in order to perform piglet pre-selection and to check the accuracy of the information provided. Farm visit schedules have to respect withdrawal periods set by the producers and the herd's veterinarian.

3.6.3 Piglet transportation

All piglets will enter the station within one (1) to two (2) consecutive days, namely on Thursday or Friday of the same week. The producers must only transport the selected piglets from their farm to the pick-up point, using previously cleaned and disinfected vehicles of their choosing. Transportation of piglets from the pick-up point to the Deschambault Station will be carried out by the CDPQ, using allocated trucks for this specific purpose.

3.7 Allotment

3.7.1 Pre-test period (Nursery)

As soon as they enter the station, all the piglets are individually weighed. Their allotment is based on their weight and health conditions. Forty eight (48) pens are available, each receiving 7 or 8 piglets (4.6 to 4 sqf / pig). This period usually lasts about 51 days.

3.7.2 Testing period (Finishing)

After being transferred to the finishing area, the pigs are allocated to twenty eight (28) pens, each having a capacity of 13 animals (10.5 sqf / pig). Allotment of pigs to a given pen is based on terminal line, sex, present weight and expected slaughtering weight. In the same pen, several terminal lines can be mixed, but sexes are separated and the weight is as homogenous as possible. Pigs with obvious anomalies are excluded from the test. The testing period starts when the average weight of all animals reaches about 30 kg. The targeted live weight at the end of the test is 115 kg.

3.8 Identification of animals

3.8.1 Pre-test period (Nursery)

During this period, a tag bearing a unique, permanent number is fixed on the ears of the piglets, to remain there until they are slaughtered. This permanent number is linked to:

- the original number given on farm
- the electronic ID number for the test period
- the tattooed number applied when the pig is sent for slaughter.

3.8.2 Testing period (Finishing)

When the animals are transferred to the finishing unit, their ears are implanted with an electronic ID (transponder chip) in order to monitor their individual feed intake using an Insentec feeding system.

3.9 Feeding

3.9.1 Pre-test period (Nursery)

Four (4) feeding periods are scheduled during the adaptation period, using feed pallets (Appendix 3 and 4). The feed will be purchased under contract from the company which wins the bid. The feed used in the first 3 periods will be defined by the supplier while the fourth will have to match the nutritional requirements defined by the CDPQ. The company will be asked to provide a precise feeding program, including:

- the different phases
- the instructions on the distribution of feed for each phase and the changeover procedures
- any required medications (these medications must be administered according to CDPQ specifications).

Feed intake measurements during the pre-test period will be calculated globally and not individually. Leftover feed will be evaluated, and the number of dead animals will be taken into account in the calculation of feed intake.

3.9.2 Testing period (Finishing)

Pigs will be transferred to the finishing unit about one week before the test starts, to ensure their adaptation to their new environment and to the individual feeding system. After their transfer, pigs will be fed the with the 4th feed used in the nursery for 2 or 3 days, then with the 1st feed of the test period, until the official starting of the test. Three (3) feeding phases are scheduled for the test period, using feed pallets. The feeding program and the feed formulation are defined by the CDPQ. Samples of feed taken from each delivery will be sent to a laboratory for analysis. For every animal, the amount of feed intake is recorded at each visit during the testing period.

The feeding program and feed formulation are defined by CPDQ Nutrition Feeding Committee (*le Comité sur la nutrition-alimentation*). This Committee is composed of a number of specialists from the industry, public and university community. The nutritional objectives of the tests #23 and 24 aim to:

- Allow the full genetic potential expression of the best performing pigs;
- Insure the continuity of diet formulations from one test to the other, in order to allow comparison between tests.

3.10 Sanitary management

3.10.1 Pre-test period (Nursery)

Before piglets enter the nursery, a cleanout of approximately two (2) weeks will be conducted, during which the station will be completely cleaned and disinfected, following an all in/all out policy. During the adaptation period, pigs will receive drugs required, in order to prevent various bacterial or parasitic infections.They will all be vaccinated against *Mycoplasma hyopneumoniae* and vaccinated to prevent pigs Circovirus illness or disease.

3.10.2 Testing period (Finishing)

The veterinarian in charge of the sanitary follow-up of the station will make regular visits according to a predefined schedule, in order to evaluate health conditions and ensure the exclusion from the test of any individual showing major anomalies. No specific treatment will be applied in the finishing pens except for particular cases during the finishing period. Furthermore,, no antimicrobial agent will be used, either to prevent diseases or either as growth factors.

In case of mortality, post-mortems will be conducted on each individual by the veterinarian of the CDPQ or by the laboratory of animal pathology of the MAPAQ. Serological tests may be conducted during the test period.

3.11 Fasting period

The day before slaughtering, all selected animals will be weighed and the feed dispensers will be closed. The fasting period, including a minimum of three hours at the slaughterhouse, will last from 16 to 20 hours. Pigs will be shipped to the slaughterhouse once a week and the slaughtering will take place over a period of 6 weeks.

3.12 Control line

In each test, 30 pig's places will be used to evaluate a control line. The control line will allow to get a same genetic type in all the tests and to create a historic data bank on performances. These data will be used as a reference to validate and comment global results (zootechnical performances, quality carcass and meat). To share the results with participating organizations and other partners of the industry, no comparison will be made between breeding line and the control line.

4. PARTICIPATION FEES

The registration of each terminal line to both tests costs a total of $14,000 (non-refundable). This fee must be paid upon registration for these tests. The laboratory costs for all Halothane gene and RN tests will be charged to participating organizations during the test period. The CDPQ will pay back the piglets to the participating commercial producers at the best market price.

5. DEFINITION OF ELIGIBILITY RULES

Rule number 1: Market share

The market share is defined as the number of semen doses of a terminal line of particular genetic scheme sold to commercial breeders, during the last twelve months, relative to all of the doses sold in Québec.

The participating organizations will have to indicate the number of doses sold during the last twelve months for every line to be registered for the tests.

This information will be confidentially passed on to the genetic sector specialist at the CDPQ. The latter will draw up, from this information, a list of the different terminal lines ranked according to the volume of semen sold and relative to the total number of inseminations carried out in Québec. The information forwarded to the genetic sector specialist will remain strictly confidential. If necessary, the genetic sector specialist will unveil the name of the four (4) lines to be tested, namely the four (4) most sold lines on the market.

Rule number 2: Registration of new terminal lines

Registration of breeding lines non-previously tested in station (tests #21-22) will be encouraged. This rule allows, as much as possible, to evaluate genetic lines that never had the opportunity to participate in terminal boar testing.

6. PUBLICATION OF RESULTS

6.1 Analysis of results

The data will be analysed only when the tests are finished. Statistical analysis will be carried out in order to compare animal results bred from the four (4) terminal lines. The significance level will be 0.05. The model chosen for the analysis is the following:

$$Y_{ijklmnop} = Cov + r_i + S_j + G_k + S_j G_k + t_{il} + b_{ijm} + p_{kn} + l_{kno} + e_{ijklmnop}$$

where:

- **Cov** is the fixed effect of a covariable
- r_i is the random effect of the trial i (i = 1,2)
- S_j is the fixed effect of sex j (j = 1,2)
- G_k is the fixed effect of the sire line (terminal line) k (k = 1,2,3 and 4)
- $S_j G_k$ is the fixed effect of the interaction between sex and the sire line
- t_{il} is the random effect of the herd l (l = 1,2, ... 23) within a trial
- b_{ijm} is the random effect of the pen m (m = 1, 2, ... 18) within sex and trial
- p_{kn} is the random effect of the sire n (n = 1,2,… 12) within the sire line
- l_{kno} is the random effect of the litter o (o = 1,…N) (N ranging from 2 to 4) within line k and sire n
- $e_{ijklmnop}$ is the residual effect on the data of the pig p (p = 1, 2) from litter o, sire n, pen m, herd l, sire line k, sex j and trial i

The covariables that can be included in the model, if they have a significant fixed effect, are the weight at the start and at the end of the test, when analyzing growth performance, and the weight at the end of test for the analysis of carcass and meat quality. The effect of interaction between theses covariables and the sex, and then between theses covariables and the terminal line, will be included in the model, if significant. The random effects due to interactions between the effect of the trial and the fixed effects will also be analyzed, if significant. Slaughter day will be included in the model as a fixed effect for the analysis of meat quality.

The effects of terminal line and sex on the proportion of the carcass that meets the market specifications will be analyzed with logistic regressions. In order to take into account the correlation between these data, we will use an approach using generalized estimation equations (GEE) and robust estimation of the variance of the estimators.

Certain data will have to be eliminated from the analysis. Several reasons justify data elimination, death of animal and poor health being the main causes. In these cases, data elimination allows to demonstrate the real genetic potential of the animals and to compare them on a similar basis.

Through its expertise, the CDPQ will make sure the testing conditions are ideal, so as to fully express the genetic potential of the pigs evaluated.

6.2 Report

A preliminary report will be given to participating organizations before publishing the final report. The final report will be descriptive and analytical; data will be presented in such a way as to make the information public. Results obtained from the trials will be presented as weighted averages for each of the terminal lines tested, with every statistical difference being indicated. The report will indicate the results concerning all variables listed in Appendix 1. No statistical analysis will be carried out on the data obtained in the nursery (adaptation period). These will be presented as a combination of results from all the animals. This final report will be available to participating organizations and will be made public. The CDPQ reserves the right to use the data of these trials for development purposes without making a distinction between the terminal lines, unless they were anonymously identified. No intermediate report or data will be divulged after the first of the two tests.

The participating organizations (genetic providers) will receive a file containing the individual raw data from the progeny of their terminal line without identification of the parents or the farm of origin.

If the mortality rate of a test is too high and/or if the animal performances are affected in such a way as to prevent any conclusion according to experts, the CDPQ could cancel this trial upon recommendation from the Station Sheering Committee and the decision by the Executive Committee. In such a case, 50% of the participation fees will be reimbursed. Also, participants will be able to get the raw individual data of their terminal line, but no results will be published.

All the participating commercial producers will be able to receive a document comparing the results of their animals with the average of all of the animals tested (without distinction of the terminal line). No statistical analysis will be performed on these comparisons.

Furthermore, at the time of the registration, all participants will have to be CDPQ's member to participate to these tests.

7. R&D CONNECTED TO TESTS

In order to lead the development of measurements of zootechnical performances and carcass and meat quality, the CDPQ might have to take others measurements and samples. Therefore, the participants have to authorize other measurements and samples than the ones specified in appendix 1. However, these specific measurements and samples will not be linked with any animal. They will stay unidentified. The participants will be informed of any additional measurement or sample taken as well as the aim related to it.

8. APPLICATION FOR PARTICIPATION

All the participants of these tests will have to sign an official application form that confirms their agreement with the proposed protocol and their commitment with regard to the testing of their male terminal breeding lines whose station entry are expected in November 2007 and May 2008 (please find enclosed the forms 1, 2, 3 and 4).

2007-03-06

APPENDIX 1 : Definition of VARIABLES

Variables	(Units)	Description
Nursery - Growth performances		
Initial age	(day)	Age at the entrance.
Final age	(day)	Age at the end of the adaptation period
Duration	(day)	Number of days between the end of the adaptation period and the entrance
Initial weight	(kg)	Weight at the entrance.
Final weight	(kg)	Weight at the end of the adaptation period
Average daily gain	(g/day)	(Weight at the end – weight at the beginning)/duration For all the period and each feeding periods
Daily feed intake	(g/day)	Piglets total feed intake/ duration For all the period and each feeding periods
Total feed intake	(g)	Piglets total feed intake For all the period and each feeding periods
Feed conversion		Piglets feed intake/live weight gain For all the period and each feeding periods
Trial - Growth performances		
On-test age	(day)	Age at the beginning of the trial
Off-test age	(day)	Age on the transportation day to the slaughterhouse before feed withdrawal
Duration	(day)	Number of days between the beginning and the end of the trial (transportation day to the slaughterhouse)
On-test weight	(kg)	Weight at the beginning of the trial
Off-test weight	(kg)	Weight on transportation day to the slaughterhouse before feed withdrawal
Average daily gain	(g/day)	(Weight at the end – weight at the beginning)/duration For all the trial period and the 4 different feeding periods
Backfat thickness	(mm)	Measure on live animal (50-75 et 115 kg), of backfat thickness between the 3rd and 4th before last ribs with ultrasound technology (US50)
Muscle depth	(mm)	Measure on live animal (50-75 et 115 kg), of muscle thickness between the 3rd and 4th before last ribs with ultrasound technology (US50.
Feed intake performances		
Total feed intake	(kg)	Total feed intake during the trial
Daily feed intake	(kg/day)	Hog total feed intake/ duration For all the trial period and the 4 different feeding periods
Feed conversion		Hog feed intake/live weight gain For all the trial period and the 4 different feeding periods
Carcass yield		
Hot carcass weight	(kg)	Weight of hot carcass after bloodletting and evisceration with head, tongue, leaf fat, kidneys, jowl, feet and no trimming
Carcass yield	(%)	(Weight of hot carcass/off-test weight) x 100
Lean yield	(%)	Carcass lean yield estimated from backfat and muscle thickness measured with a Destron probe (1992 equation)
Loin eye area	cm^2	Surface obtained with a planimeter
Index (Quebec slaughter grid)		Index obtained from the 2004 Quebec slaughter grid

DEFINITION OF VARIABLES (continued)

Variables	(Units)	Description
Primal cuts		
Reconstituted half. carc.	(kg)	Half carcass weight reconstituted from the 4 following primal cuts: leg (ham), loin, shoulder, and belly
Leg weight	(kg)	Perpendicular cut at the lower part of leg. Cutting up line at 4.5 cm (1¾ inch) from internal tip of pubic bone. Without back foot and tail
Loin weight	(kg)	Loin is cut off from belly at the end of the shoulder, starts at 4,5 cm (1¾ inch) from the basis of ribs, widen at 10 cm (4 inches) at the center of loin and finishes at the end of the leg running along the tenderloin at 2 cm (¾ inch)
Shoulder weight	(kg)	See the loin weight description
Belly weight	(kg)	See the loin weight description
Leg yield	(%)	(Leg weight/reconstituted half carcass weight) x 100
Loin yield	(%)	(Loin weight/reconstituted half carcass weight) x 100
Shoulder yield	(%)	(Shoulder weight/reconstituted half carcass weight) x 100
Belly yield	(%)	(Belly weight/reconstituted half carcass weight) x 100

DEFINITION OF VARIABLES (continued)

Variables	(Units)	Description
Meat quality		
a. Loin: measure taken on longissimus dorsi between the 3rd and 4th before last ribs, 18 to 24 hours after slaughtering		
pH 24 hour	pH 24 h	pH measurement in two sites in the loin muscle with a pH-meter
Minolta (L*a*b)	Lab	Measurement of L*a*b in two sites in the loin muscle with a Minolta machine
Color	Color	Assessment with colour scores of the Japanese scale graded from 1 to 6 (1: pale; 6: dark)
Marbling (NPPC) (loin)	Marbling	Measurement of marbling score according to NPPC scale, graded from 1 to 10 (1 : lightly marbled; 10 : strongly marbled)
Firmness	Firmness (%)	Subjective measurement taken from meat handling (% loin firm/total number)*100
Drip loss (loin)	(%)	Measurement from a muscle sample taken in the loin front part, which has been dripping for 24 to 48 hours. (Muscle water loss/ weight of fresh muscle) x 100
b. Leg : measure taken on different muscles, 18 to 24 hours after slaughtering		
Minolta (L*a*b)	Lab	Measurement of L*a*b in two sites in the *gluteus medius* muscle with a Minolta machine
pH 24 hour	pH 24 h	pH measurement in two sites in the loin muscle with a pH-meter. Measurement at the level of *gluteus superficialis* muscle
Bicoloration	Bicoloration	Color difference between the *gluteus medius* and the *gluteus profondus* from the Japanese scale
Color	Color	Assessment with colour scores of the Japanese scale graded from 1 to 6 (1 : pale; 6 : dark). The assessment is done with *gluteus superficialis* muscle
c. Belly: measure taken on different muscles, 18 to 24 hours after slaughtering		
Firmness	Firmness (mm)	Measurement taken from the belly, boneless draping over a metallic rod for a period of 2 minutes (belly bend method)
d. Quebec Market Reference		
Quebec Market Reference (2003)	Targeted interval	Quebec Market Reference (2003) specifications lower and higher limits
Quebec Market Reference (2003)	% of targeted interval	Quebec Market Reference (2003) of the carcass pourcentage for certain measurements of meat quality

Variables	(Units)	Description
Halothane and RN genotype		
Halothane status of boars	Status (% (number/total))	Results of Halothane (HAL-1843) gene tests. Percent of boars negative reactor (HAL nm), carrier (HAL mm) and positive reactor (HAL dm)
Rn status of boars	Status (% (number/total))	Results of Rn gene tests. Percent of boars negative (rn+rn+), carrier (RN-rn+) and positive (RN-RN-)