

**September 5, 2013**

# **Deschambault swine testing station**

## **Station trials 32 and 33**

### **Evaluation of sire lines:**

- Genesus Duroc
- Magnus
- Talent
- Tempo

Frédéric Fortin, M. Sc., geneticist

# Outline

- Introduction
- Description of the test
- Results per sire line
  - Live performances
  - Carcass quality
  - Meat quality
- Additional results
- Conclusion and acknowledgements



# CDPQ Test Station

- Built in 1994 at Deschambault
- Nursery – finishing for 360 pigs
- All-in-all-out swine production



# CDPQ Test Station

Station's features include:

- Individual feeding system
- Carcass and meat quality measurements at the slaughter plant
- Experienced team and thorough measurements





# A tool of and for the swine industry

- Station
  - Owned by the swine industry
  - Provides answers to questions from the swine industry
  - Useful for R & D projects
- Objectives defined:
  - By a test station committee with industry representatives
  - Purebred trials or commercial trials

## Description of the test

- The results are a reference for:
  - Quebec swine industry
    - commercial producers
    - slaughterhouses
    - advisers
    - scientists
    - decision-makers
    - etc.
  - Participating organizations

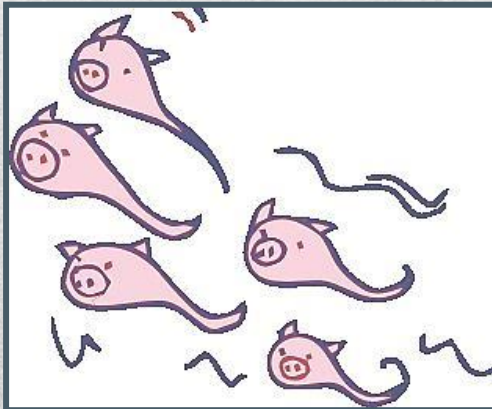


## Description of the test

- Objective of the test:
  - To measure, in a controlled and non-limiting environment, the growth performances, carcass and meat quality of commercial pigs sired from terminal lines representative of genetic lines available in Québec

# Protocol of terminal line trials

- Registration of breeding companies
- 3 to 4 terminal lines evaluated per trial
- Piglets from 10 to 20 commercial herds



Canadian Swine Health Board 2013





## Protocol of terminal line trials

- For the matings, a minimum of 15 boars per terminal line available in Quebec boar studs is required
- At entry, piglets are between 10 and 16 days old
- Slaughter over approx. 6 weeks (one a week)



## Terminal lines tested at the station in the past 8 years

List of trials	Sire lines	Participating organizations
Trials 19-20 (July 2005 and January 2006)	Duroc	Alliance Duroc
	P76	Pen Ar Lan Canada inc.
	PIC 337	PIC Canada Ltd.
	Vivanda 300	Génétiporc inc.
Trials 21-22 (November 2006 and May 2007)	Duroc Sogeporc	Sogeporc inc.
	EB5®	Monsanto Choice Genetics
	Genex Duroc	Hypor Inc.
	QBX™	Monsanto Choice Genetics



## Terminal lines tested at the station in the past 8 years

List of trials	Sire lines	Participating organizations
<b>Trials 23-24</b> (November 2007 and May 2008)	Duroc PIC 280 Rock-Y	Alliance Duroc PIC Canada Ltd. Hypor Inc.
<b>Trials 25-26</b> (November 2008 and May 2009)	G Performer Shade Oak Duroc	Génétiporc inc. Hypor Inc.
<b>Trials 32-33</b> (May and November 2012)	Genesis Duroc Magnus Talent Tempo	Genesis inc. Hypor Inc. Topigs Canada Topigs Canada



## Description of the test

<b>Sire lines</b>	<b>Participating organizations</b>
Genesis Duroc	Genesis inc.
Magnus	Hypor inc.
Talent	Topigs inc.
Tempo	Topigs inc.



## Description of the test

- Two commercial trials

**Trial 32: May 2012**

**Oct.-Nov. 2012**

**Trial 33: November 2012**

**April-May 2013**



# Description of the test

## Boars



Genesis Duroc



Talent



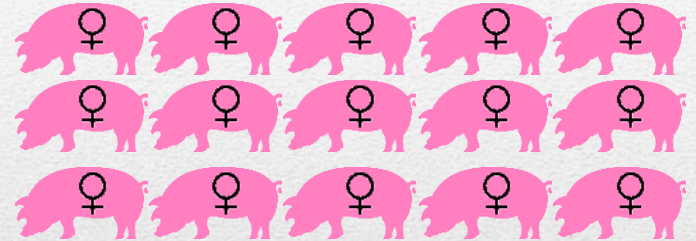
Magnus



Tempo



## Sows



Yorkshire-Landrace  
≈ 15 commercial farms

652 females and barrows in the test station  
(2 commercial trials)







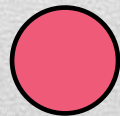
Slaughterhouse:  
Abattoir Aliments ASTA inc.



# Interpretation of the results for the lines

## Sire lines

	Line A	Line B	Line C	Line D
Traits				
LS Mean	W	X	y	Z



1<sup>st</sup> position



2<sup>nd</sup> position

# Growth Performances



## Description of growth traits

- Test period
  - On test weight: 29.6 kg
  - Off test weight: 129.7 kg

### Sire lines

Growth Performances	Genesis Duroc	Magnus	Talent	Tempo
On test weight (kg)	30.8 <sup>A</sup>	29.7 <sup>AB</sup>	28.3 <sup>B</sup>	29.6 <sup>AB</sup>
Off test weight (kg)	130.1 <sup>A</sup>	130.3 <sup>A</sup>	128.4 <sup>A</sup>	129.7 <sup>A</sup>

- The effects of the initial and final weight were taken into account in the data analysis of some traits

# Description of growth traits









- Off-test age (days)
  - Age of commercial pigs at the end of the finishing phase
  - Takes into account growth in the nursery and finishing phases
- Average daily gain (g/day)
  - Growth of the finishing phase





# Performances of lines for growth traits

## Sire lines

Growth Performances	Genesis Duroc	Magnus	Talent	Tempo	Desired value
Off test Age					<
LS Mean (day)	161.4 <sup>B</sup>	161.8 <sup>B</sup>	166.0 <sup>A</sup>	163.3 <sup>AB</sup>	
ADG (30 – 130 kg)					>
LS Mean (g/d)	1 067 <sup>AB</sup>	1 081 <sup>A</sup>	1 038 <sup>B</sup>	1 066 <sup>AB</sup>	


# Description of feed intake measurements

- Total feed intake (kg)
  - Total feed intake during trial
- Feed conversion ratio (kg/kg)
  - Hog feed intake / liveweight gain
- Daily feed intake (kg/day)
  - Hog feed intake / duration





# Performances of lines for feed intake

Growth Performances	Sire lines				Desired value
	Genesis Duroc	Magnus	Talent	Tempo	
Total feed intake 30 - 130 kg					<
LS Mean (kg)	260.2 <sup>A</sup>	251.4 <sup>B</sup>	249.6 <sup>B</sup>	250.7 <sup>B</sup>	
Feed conversion ratio 30 – 130 kg					<
LS Mean (kg/kg)	2.61 <sup>B</sup>	2.52 <sup>A</sup>	2.51 <sup>A</sup>	2.51 <sup>A</sup>	
Daily feed intake 30 – 130 kg					
LS Mean (kg/d)	2.78 <sup>A</sup>	2.70 <sup>AB</sup>	2.58 <sup>C</sup>	2.65 <sup>BC</sup>	

















## Description of growth traits per period

- Average daily gain (g/day)
  - Per period:
    - ADG 30 – 50 kg (g/day)
    - ADG 50 – 75 kg (g/day)
    - ADG 75 – 100 kg (g/day)
    - ADG 100 – 130 kg (g/day)
- Feed conversion ratio (kg/kg)
  - Per period:
    - FCR 30 – 50 kg (kg/kg)
    - FCR 50 – 75 kg (kg/kg)
    - FCR 75 – 100 kg (kg/kg)
    - FCR 100 – 130 kg (kg/kg)



















# Performances of lines for growth traits per period

## Sire lines

Growth Performances	Genesis Duroc	Magnus	Talent	Tempo	Desired Value
ADG 30-50 kg (g/day)					>
LS Mean (g/d)	968 <sup>A</sup>	944 <sup>A</sup>	934 <sup>A</sup>	940 <sup>A</sup>	
ADG 50-75 kg (g/day)					>
LS Mean (g/d)	1051 <sup>A</sup>	1053 <sup>A</sup>	1011 <sup>A</sup>	1049 <sup>A</sup>	
ADG 75-100 kg (g/day)					>
LS Mean (g/d)	1130 <sup>A</sup>	1147 <sup>A</sup>	1108 <sup>A</sup>	1116 <sup>A</sup>	
ADG 100-130 kg (g/day)					>
LS Mean (g/d)	1112 <sup>AB</sup>	1175 <sup>A</sup>	1101 <sup>B</sup>	1150 <sup>AB</sup>	

# Performances of lines for growth traits per period

## Sire lines

Growth Performances	Genesis Duroc	Magnus	Talent	Tempo	Desired Value
FCR 30-50 kg					<
LS Mean	1.80 <sup>A</sup>	1.73 <sup>A</sup>	1.75 <sup>A</sup>	1.73 <sup>A</sup>	
FCR 50-75 kg					<
LS Mean	2.41 <sup>A</sup>	2.31 <sup>A</sup>	2.31 <sup>A</sup>	2.33 <sup>A</sup>	
FCR 75-100 kg					<
LS Mean	2.77 <sup>A</sup>	2.68 <sup>A</sup>	2.65 <sup>A</sup>	2.68 <sup>A</sup>	
FCR 100-130 kg					<
LS Mean	3.15 <sup>A</sup>	3.03 <sup>AB</sup>	3.03 <sup>AB</sup>	2.98 <sup>B</sup>	



# Carcass Quality

# Description of carcass grading measurements

- Destron backfat and muscle depth
- Lean yield (based on backfat and muscle depth)
- Hogs index from «Porc Qualité Québec» pricing grids
  - Including only pigs between 92.5 and 115.4 kg carcass weight

Lean yield (%)	Carcass weight (kg)									
	0.1	70.1	77.5	82.5	87.5	92.5	100	107.5	115.5	118.5
	70.0	77.4	82.4	87.4	92.4	99.9	107.4	115.4	118.4	999.9
64.30 - et plus	40	65	80	95	103	110	110	110	99	80
61.80 - 64.29	40	65	85	99	103	110	110	110	100	80
59.60 - 61.79	40	65	85	100	109	115	115	115	104	80
57.70 - 59.59	40	65	85	102	107	112	112	112	102	80
56.80 - 57.69	40	65	85	95	100	107	107	107	96	75
56.10 - 56.79	40	65	80	85	90	102	102	102	90	75
54.70 - 56.09	40	65	80	80	90	95	95	95	85	70
1.00 - 54.69	40	65	80	65	70	75	75	75	70	50

Grid effective during trials 32-33

([http://www.fppq.upa.qc.ca/nsphp/portail/Info\\_Grille.php](http://www.fppq.upa.qc.ca/nsphp/portail/Info_Grille.php))

<https://www.westernhogexchange.com/gradingGrids.aspx>







**CDPQ**

Centre de développement  
du porc du Québec inc.



# Performances of lines for carcass grading measurements

Carcass quality	Sire lines				Desired value
	Genesis Duroc	Magnus	Talent	Tempo	
<b>Backfat Destron</b>					
LS Mean (mm)	20.54 <sup>A</sup>	19.86 <sup>A</sup>	17.41 <sup>B</sup>	17.78 <sup>B</sup>	
<b>Muscle depth Destron</b>					
LS Mean (mm)	67,13 <sup>A</sup>	68,15 <sup>A</sup>	69,66 <sup>A</sup>	68,76 <sup>A</sup>	
<b>Lean yield</b>					
LS Mean (%)	60,01 <sup>B</sup>	60.34 <sup>B</sup>	61.49 <sup>A</sup>	61.25 <sup>A</sup>	
<b>Grading grid index (92.5-115.4 kg)*</b>					>
LS Mean	112.01 <sup>A</sup>	112.84 <sup>A</sup>	112.37 <sup>A</sup>	112.30 <sup>A</sup>	

# Description of carcass quality measurements

## Off-test backfat and muscle depth

Ultrasound measurements (US)



Loin eye area



# Description of carcass quality measurements

## Carcass yield





Hot carcass weight / Off test weight



## Half-carcass length

Foster rule (cm)

# Performances of lines for carcass quality measurements

Carcass quality	Sire lines				Desired value
	Genesis Duroc	Magnus	Talent	Tempo	
<b>Carcass length</b>					
LS Mean (cm)	84.97 <sup>A</sup>	85.26 <sup>A</sup>	85.25 <sup>A</sup>	85.46 <sup>A</sup>	
<b>Off-test backfat</b>					
LS Mean (mm)	18.14 <sup>A</sup>	17.03 <sup>AB</sup>	15.01 <sup>C</sup>	15.68 <sup>BC</sup>	
<b>Off-test muscle depth</b>					
LS Mean (mm)	66.96 <sup>A</sup>	67.42 <sup>A</sup>	67.67 <sup>A</sup>	66.90 <sup>A</sup>	
<b>Loin eye area</b>					
LS Mean (cm <sup>2</sup> )	50.14 <sup>B</sup>	50.94 <sup>AB</sup>	53.29 <sup>A</sup>	51.50 <sup>AB</sup>	
<b>Carcass yield</b>					>
LS Mean (%)	80.47 <sup>A</sup>	80.44 <sup>A</sup>	80.86 <sup>A</sup>	80.57 <sup>A</sup>	



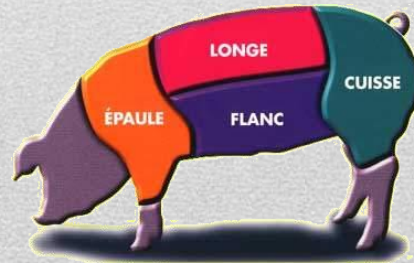
# Description of carcass quality measurements

## Primal cuts yield

Primal cut weight

/

Reconstituted half carc.



# Performances of lines for carcass quality measurements

Primal cuts	Sire lines				Desired value
	Genesis Duroc	Magnus	Talent	Tempo	
Ham yield (%)	25.90 <sup>C</sup>	26.09 <sup>BC</sup>	26.81 <sup>A</sup>	26.38 <sup>B</sup>	
Loin yield (%)	28.42 <sup>A</sup>	28.15 <sup>A</sup>	28.13 <sup>A</sup>	28.04 <sup>A</sup>	
Shoulder yield (%)	27.23 <sup>AB</sup>	27.43 <sup>A</sup>	26.88 <sup>B</sup>	27.09 <sup>AB</sup>	
Belly yield (%)	18.45 <sup>A</sup>	18.31 <sup>A</sup>	18.14 <sup>A</sup>	18.49 <sup>A</sup>	



# Meat Quality

# Description of loin quality measurements



Ultimate pH 24h



Luminosity



Color

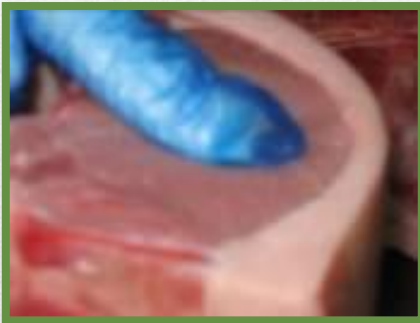


# Performances of lines for loin quality measurements

Loin quality	Sire lines				Desired value
	Genesis Duroc	Magnus	Talent	Tempo	
Ultimate pH 24 h					
LS Mean	5.62 <sup>A</sup>	5.60 <sup>A</sup>	5.57 <sup>A</sup>	5.60 <sup>A</sup>	
Luminosity					
LS Mean	50.45 <sup>A</sup>	51.12 <sup>A</sup>	51.13 <sup>A</sup>	50.64 <sup>A</sup>	
Color (Japanese scale)					
LS Mean	3.65 <sup>A</sup>	3.48 <sup>AB</sup>	3.42 <sup>B</sup>	3.50 <sup>AB</sup>	

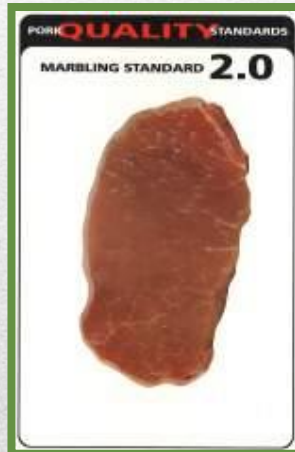
# Description of loin quality measurements

## Firmness



- 1: soft
- 2: medium
- 3: firm

## Marbling






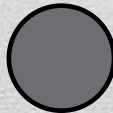
## Drip loss



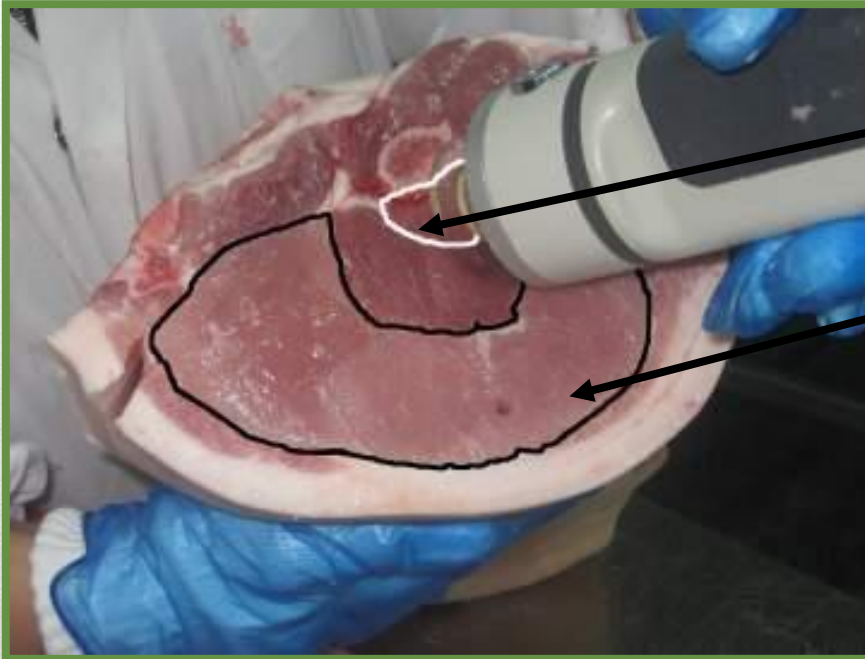
(<)



# Performances of lines for loin quality measurements

Loin quality	Sire lines				Desired Value
	Genesis Duroc	Magnus	Talent	Tempo	
<b>Firmness</b>					
LS Mean	2.69 <sup>A</sup>	2.43 <sup>B</sup>	2.47 <sup>AB</sup>	2.26 <sup>B</sup>	
<b>Marbling (NPPC scale)</b>					
LS Mean	2.89 <sup>A</sup>	2.76 <sup>A</sup>	2.23 <sup>B</sup>	2.31 <sup>B</sup>	
<b>Drip loss</b>					<
LS Mean (%)	2.87 <sup>B</sup>	3.40 <sup>AB</sup>	3.62 <sup>AB</sup>	4.04 <sup>A</sup>	

## Description of ham quality measurements



*Gluteus profundus*

*Gluteus medius*

- Ultimate pH 24h
- Luminosity
- Color

Bicoloration: Color difference between gluteus medius and gluteus profundus





Tech. yield: Prediction equation from color and reflectance measurements of gluteus medius and profundus ( > )



# Performances of lines for ham quality measurements

Ham quality	Sire lines				Desired Value
	Genesis Duroc	Magnus	Talent	Tempo	
Ultimate pH 24 h					
LS Mean	5.59 <sup>AB</sup>	5.59 <sup>AB</sup>	5.55 <sup>B</sup>	5.61 <sup>A</sup>	
Luminosity					
LS Mean	52.10 <sup>B</sup>	53.15 <sup>AB</sup>	53.60 <sup>A</sup>	52.34 <sup>AB</sup>	
Color (Japanese scale)					
LS Mean	3.75 <sup>A</sup>	3.53 <sup>BC</sup>	3.47 <sup>C</sup>	3.66 <sup>AB</sup>	

# Performances of lines for ham quality measurements

Ham quality	Sire lines				Desired Value
	Genesis Duroc	Magnus	Talent	Tempo	
Bicoloration					
LS Mean	1.57 <sup>A</sup>	1.61 <sup>A</sup>	1.71 <sup>A</sup>	1.59 <sup>A</sup>	
Technological yield					>
LS Mean (%)	126.84 <sup>AB</sup>	127.22 <sup>A</sup>	126.55 <sup>AB</sup>	126.41 <sup>B</sup>	



# More Results

# Gender performances

Growth performances	Females	Barrows	Sex diff.
Off-test age* (days)	166.3	159.9	6.4
ADG 30-130 kg* (g/day)	1 032	1 094	62

\* Significantly different ( $p < 0.05$ ) between sex



# Gender performances

Carcass grading performances	Females	Barrows	Sex diff.
Off-test backfat DESTRON* (mm)	17.23	20.63	3.40
Off-test muscle DESTRON* (mm)	69.47	67.38	2.10
Lean yield* (%)	61.55	59.99	1.56

\* Significantly different ( $p < 0.05$ ) between sex

# Gender performances

Feed intake performances	Females	Barrows	Sex diff.
Total feed intake* (kg)	248.5	257.4	8.9
Daily feed intake* (kg/day)	2.55	2.80	0.25
Feed conversion ratio* (kg/kg)	2.49	2.58	0.09

\* Significantly different ( $p < 0.05$ ) between sex



## Gender performances

Carcass quality measurements	Females	Barrows	Sex diff.
Loin eye area* (cm <sup>2</sup> )	53.46	49.48	3.98
Carcass length* (cm)	85.63	84.83	0.80
Ham yield* (%)	26.59	26.00	0.58
Loin yield* (%)	28.06	28.31	0.25
Shoulder yield* (%)	27.05	27.27	0.22

\* Significantly different ( $p < 0.05$ ) between sex

# Gender performances

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Meat quality measurements	Females	Barrows	Sex diff.
Marbling (NPPC scale)	2.38	2.70	0.32

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\* Significantly different ( $p < 0.05$ ) between sex



# Health performances

Mortality reasons	Trial 32		Trial 33	
	Nursery	Finishing	Nursery	Finishing
Bad condition <sup>1</sup>				
Weakening	3	2		1
Locomotive problems		3		2
Nervous problems				
Respiratory problems	10			
Sudden death	4	1	4	
Meningitis	7	1	4	
Others conditions		3		3
<b>Total (%)</b>	<b>24/352 (6.8%)</b>	<b>10/328 (3.0%)</b>	<b>8/352 (2.3%)</b>	<b>6/344 (1.7%)</b>

<sup>1</sup> Piglets in bad condition at beginning (0-3 days)

## Nursery performances

Table of piglets performances during the nursery:

Diet	Age (days)	Weight (kg)	ADG (g/day)	Feed conv.
1	12.9 à 22.9	5.0 à 6.0	98	1.03
2	22.9 à 30.4	6.0 à 7.5	199	1.51
3	30.4 à 41.9	7.5 à 13.2	492	1.23
4	41.9 à 68.4	13.2 à 29.7	617	1.58
Global	13.2 à 68.4	5.0 à 29.7	438	1.47



**Warning:  
not relevant to compare the results of sire lines in different trials**

More differences of performance within each trial than between trials

Traits	Result	Test 19	Test 20	Test 21	Test 22	Test 23	Test 24	Test 25	Test 26	Test 32	Test 33
ADG (g/d)	By test	1077	1003	1047	1020	1017	1027	1035	1066	1054	1066
	By trial	1038		1030		1022		1051		1061	
Off-test backfat (mm)	By test	15.0	13.6	15.1	16.5	15.0	15.4	14.2	14.2	16.8	16.6
	By trial	14.4		15.8		15.2		14.2		16.7	

# Conclusion

- The 32<sup>nd</sup> and 33<sup>rd</sup> station trials have showed:
  - Differences of performance for the sire lines:
    - Growth performances
    - Carcass quality
    - Meat quality



# Acknowledgements

## Financial partners

- Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec (MAPAQ)
- Programme d'appui financier aux associations de producteurs désignées (MAPAQ)
- Fédération des producteurs de porcs du Québec (FPPQ)

# Acknowledgements

## Team work

- Planning
  - Comité d'orientation des épreuves en station du CDPQ
  - Frédéric Fortin
- Application of protocol
  - Richard Mailhot
  - Jean-Paul Daigle
  - Mélanie Roy
  - Marie-Pierre Fortier
  - CDPQ technicians
- Farm operation
  - Louis Moffet
- Statistical analysis
  - Joël Rivest
- Health protocol and follow-up
  - Réal Boutin
  - Andréanne Caron
- Feeding protocol
  - Richard Mailhot



# Acknowledgements

## Commercial farms

- 3089-9512 Québec inc
- Agri-Marché inc. (Ferme du Plateau)
- Élevages Lessard inc.
- Ferme A. Coupal et fils inc.
- Ferme Aguy et fils
- Ferme Curran
- Ferme Danmarc
- Ferme Hugo Bergeron
- Ferme Le Point-des-Porcs
- Ferme Mario Mathieu
- Ferme Mirotec
- Isoporc inc.
- Progeniporc 2011 inc.

# Acknowledgements

## Close collaborators

- Agri-Marché inc. (SIAM)
- Centre d'insémination porcine du Québec inc. (CIPQ)
- F. Ménard inc.
- Gène-Alliance Inc.
- Genesis inc.
- Hypor inc.
- Topigs Canada inc.



**Any questions?**

**Thank you!**