

September 5, 2013

Deschambault swine testing station Station trials 32 and 33

Evaluation of sire lines:

- Genesus Duroc
- Magnus
- Talent
- Tempo

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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

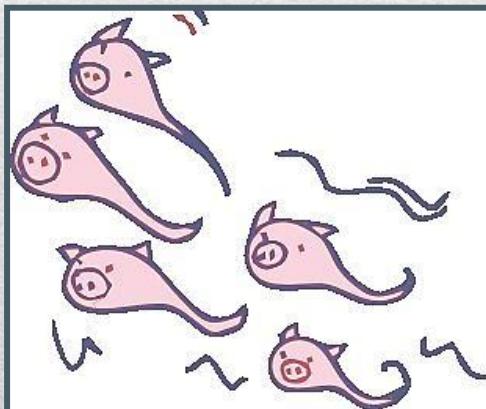
- The results are a reference for:
 - Quebec swine industry
 - commercial producers
 - slaughterhouses
 - advisers
 - scientists
 - decision-makers
 - etc.
 - Participating organizations

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 P76 PIC 337 Vivanda 300	Alliance Duroc Pen Ar Lan Canada inc. PIC Canada Ltd. Génétiporc inc.
Trials 21-22 (November 2006 and May 2007)	Duroc Sogeporc EB5® Genex Duroc QBX™	Sogeporc inc. Monsanto Choice Genetics Hypor Inc. Monsanto Choice Genetics

Terminal lines tested at the station in the past 8 years

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

Description of the test

Sire lines	Participating organizations
Genesus Duroc	Genesus inc.
Magnus	Hypor inc.
Talent	Topigs inc.
Tempo	Topigs inc.

Description of the test

- Two commercial trials

Trial 32: May 2012

Trial 33: November 2012

Oct.-Nov. 2012

April-May 2013



Description of the test

Boars



Genesus Duroc



Talent



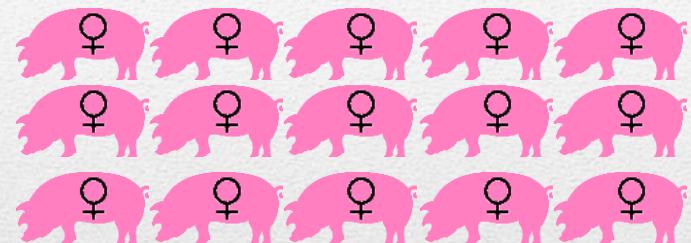
Magnus



Tempo



Sows



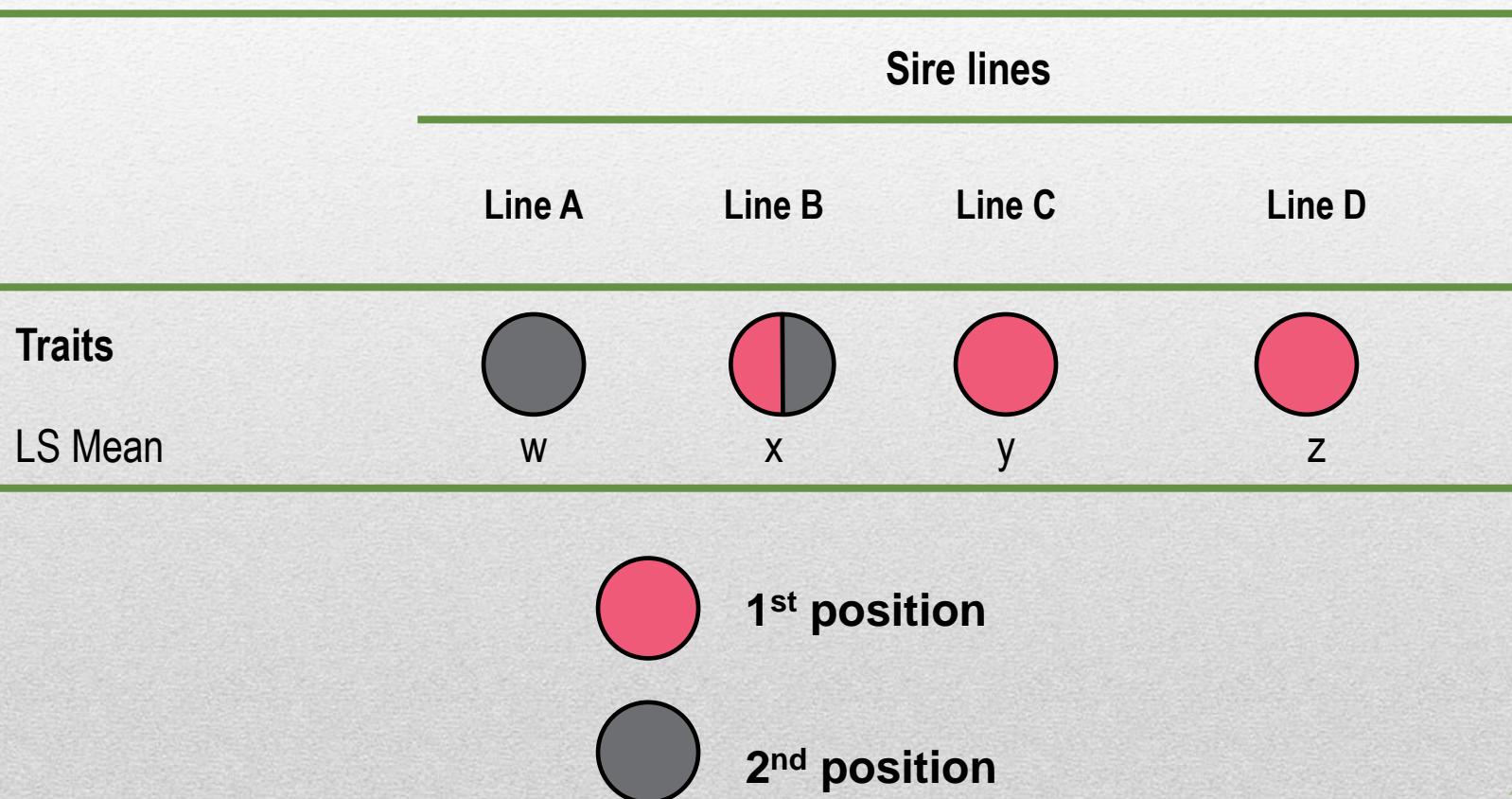
Yorkshire-Landrace
≈ 15 commercial farms

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



Slaughterhouse:
Abattoir Aliments ASTA inc.

Interpretation of the results for the lines



Growth Performances

Description of growth traits

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

Growth Performances	Sire lines			
	Genesus Duroc	Magnus	Talent	Tempo
On test weight (kg)	30.8 ^A	29.7 ^{AB}	28.3 ^B	29.6 ^{AB}
Off test weight (kg)	130.1 ^A	130.3 ^A	128.4 ^A	129.7 ^A

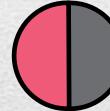
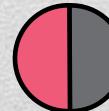
- The effects of the initial and final weight were taken into account in the data analysis of some traits

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

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

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	
	Genesus Duroc	Magnus	Talent		
Total feed intake 30 - 130 kg					<
LS Mean (kg)	260.2 ^A	251.4 ^B	249.6 ^B	250.7 ^B	
Feed conversion ratio 30 – 130 kg					<
LS Mean (kg/kg)	2.61 ^B	2.52 ^A	2.51 ^A	2.51 ^A	
Daily feed intake 30 – 130 kg					
LS Mean (kg/d)	2.78 ^A	2.70 ^{AB}	2.58 ^C	2.65 ^{BC}	

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

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

Performances of lines for growth traits per period

Growth Performances	Sire lines				Desired Value
	Genesus Duroc	Magnus	Talent	Tempo	
FCR 30-50 kg					<
LS Mean	1.80 ^A	1.73 ^A	1.75 ^A	1.73 ^A	
FCR 50-75 kg					<
LS Mean	2.41 ^A	2.31 ^A	2.31 ^A	2.33 ^A	
FCR 75-100 kg					<
LS Mean	2.77 ^A	2.68 ^A	2.65 ^A	2.68 ^A	
FCR 100-130 kg					<
LS Mean	3.15 ^A	3.03 ^{AB}	3.03 ^{AB}	2.98 ^B	

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)

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



Performances of lines for carcass grading measurements

Carcass quality	Sire lines				Desired value
	Genesus Duroc	Magnus	Talent	Tempo	
Backfat Destron					
LS Mean (mm)	20.54 ^A	19.86 ^A	17.41 ^B	17.78 ^B	
Muscle depth Destron					
LS Mean (mm)	67,13 ^A	68,15 ^A	69,66 ^A	68,76 ^A	
Lean yield					
LS Mean (%)	60,01 ^B	60,34 ^B	61,49 ^A	61,25 ^A	
Grading grid index (92.5-115.4 kg)*					
LS Mean	112.01 ^A	112.84 ^A	112.37 ^A	112.30 ^A	>

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
	Genesus Duroc	Magnus	Talent	Tempo	
Carcass length					
LS Mean (cm)	84.97 ^A	85.26 ^A	85.25 ^A	85.46 ^A	
Off-test backfat					
LS Mean (mm)	18.14 ^A	17.03 ^{AB}	15.01 ^C	15.68 ^{BC}	
Off-test muscle depth					
LS Mean (mm)	66.96 ^A	67.42 ^A	67.67 ^A	66.90 ^A	
Loin eye area					
LS Mean (cm ²)	50.14 ^B	50.94 ^{AB}	53.29 ^A	51.50 ^{AB}	
Carcass yield					
LS Mean (%)	80.47 ^A	80.44 ^A	80.86 ^A	80.57 ^A	>

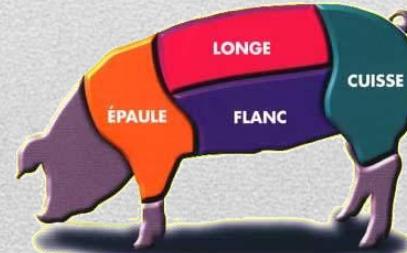
Description of carcass quality measurements

Primal cuts yield

Primal cut weight

/

Reconstituted half carc.



Performances of lines for carcass quality measurements

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

Meat Quality

Description of loin quality measurements



Ultimate pH 24h



Luminosity



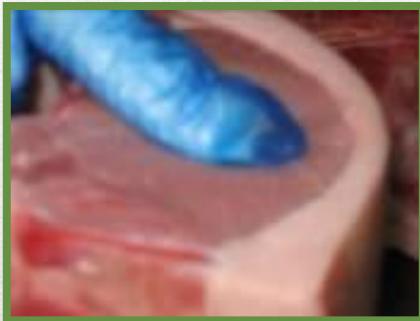
Color

Performances of lines for loin quality measurements

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

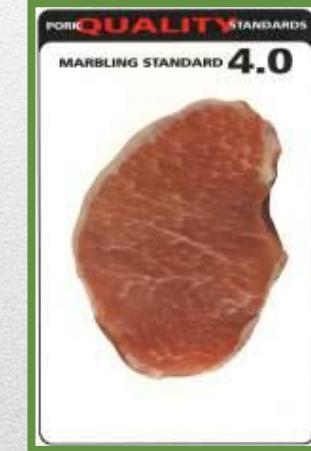
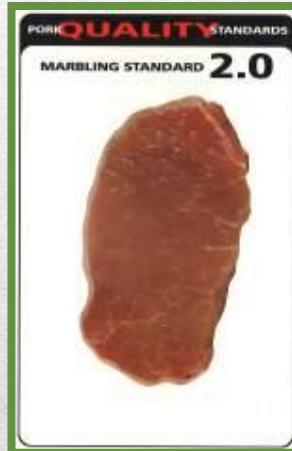
Description of loin quality measurements

Firmness



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

Marbling



Drip loss



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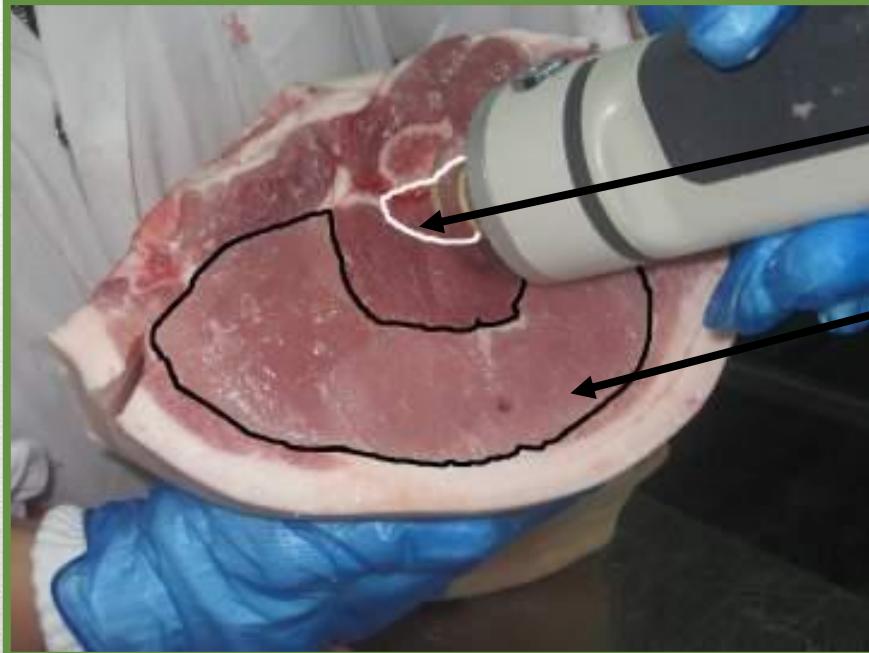
CDPQ

Centre de développement
du porc du Québec inc.

Performances of lines for loin quality measurements

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

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
	Genesus Duroc	Magnus	Talent	Tempo	
Ultimate pH 24 h					
LS Mean	5.59 ^{AB}	5.59 ^{AB}	5.55 ^B	5.61 ^A	
Luminosity					
LS Mean	52.10 ^B	53.15 ^{AB}	53.60 ^A	52.34 ^{AB}	
Color (Japanese scale)					
LS Mean	3.75 ^A	3.53 ^{BC}	3.47 ^C	3.66 ^{AB}	

Performances of lines for ham quality measurements

Ham quality	Sire lines				Desired Value
	Genesus Duroc	Magnus	Talent	Tempo	
Bicoloration					
LS Mean	1.57 ^A	1.61 ^A	1.71 ^A	1.59 ^A	
Technological yield					>
LS Mean (%)	126.84 ^{AB}	127.22 ^A	126.55 ^{AB}	126.41 ^B	

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 ²)	53.46	49.48	3.98
Carcass lenght* (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

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

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

Health performances

Mortality reasons	Trial 32		Trial 33	
	Nursery	Finishing	Nursery	Finishing
Bad condition ¹				
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
Total (%)	24/352 (6.8%)	10/328 (3.0%)	8/352 (2.3%)	6/344 (1.7%)

¹ 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 32nd and 33rd 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)
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Acknowledgements

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- Feeding protocol
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Acknowledgements

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- 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.

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- F. Ménard inc.
- Gène-Alliance Inc.
- Genesus inc.
- Hypor inc.
- Topigs Canada inc.

Any questions?

Thank you!