21st and 22nd station trials

Evaluation of terminal lines DUROC SOGÉPORC, EB5®, GENEX DUROC and QBX™

Centre de développement du porc du Québec inc.

January 2008

Outline

- **Description of the test**
- **Results of terminal lines**
  - Live performances
  - Carcass quality
  - Meat quality
- **Additional results**
- **Conclusion**

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Description of the test

- **Objective of the test:**
  - To measure in a controlled and non limiting environment, performances of commercial pigs born from terminal lines for which semen is available in Quebec

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Description of the test

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

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Description of the test

- Two commercial trials

Trial 21

November 2006

May 2007

Trial 22

May 2007

October 2007

- Terminal lines test
- 3 participating organizations

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Description of the test

Sire lines	Participating organizations
DUROC SOGÉPORC	Sogéporc inc.
EB5®	Monsanto Choice Genetics
GENEX DUROC	Hypor inc.
QBX™	Monsanto Choice Genetics

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Description of the test

Boars:
Duroc Sogéporc, EB5®,
Genex Duroc, QBX™
(≈ 20 sires per line)

X

Yorkshire-Landrace Sows
(175 sows from
≈ 20 commercial farms)

↓

Hogs in test station
(664 castrates or females)

↓

Slaughterhouse
(Abattoir Aliments ASTA inc.)

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Description of the test

Deschambault test station

Nursery – finishing for 360 pigs

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Description of the test

Specifities of the test:

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

Interpretation of the results for sire lines

	Terminal Lines			
	Line 1	**Line 2**	**Line 3**	**Line 4**
ADG				
Mean value (g/d)	**w**	**x**	**y**	**z**

1st position 2nd position 3rd position

Not applicable

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Growth Performances

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Description of growth traits

- **Test period**
  - On-test weight: 33.11 kg
  - Off test weight: 112.73 kg
- **Performance of terminal lines**

	Duroc Sogéporc	EB5®	Genex Duroc	QBX™
On-test weight* (kg)	**34.21^{A}**	**33.44^{B}**	**32.19^{C}**	**32.60^{C}**
Off-test weight (kg)	**112.83^{A}**	**113.10^{A}**	**112.91^{A}**	**112.09^{A}**

* Significant difference between lines

- **The initial weight different between lines was taken into account in data analysis.**

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Description of growth traits

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

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Performances of terminal lines for growth traits

Growth Performances	Duroc Sogéporc	EB5®	Genex Duroc	QBX™	Desired value
Off-test Age					<
LS Mean (day)	145.6^{AB}	144.7^{B}	149.1^{A}	148.8^{A}	
ADG 30-112 kg					>
LS Mean (g/d)	1028^{AB}	1059^{A}	1024^{AB}	1011^{B}	

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Description of feed intake measurements

- **Total feed intake (kg)**
  - Total feed intake during the trial
- **Feed conversion ratio (kg/kg)**
  - Hog feed intake / live weight gain
- **Daily feed intake (kg/day)**
  - Hog feed intake / duration

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Performances of terminal lines for feed intake

Growth Performances	Duroc Sogéporc	EB5®	Genex Duroc	QBX™	Desired value
Total feed intake 30 – 112 kg					<
LS Mean (kg)	190^{B}	201^{A}	197^{A}	199^{A}	
Feed conversion ratio 30 – 112 kg					<
LS Mean (kg/kg)	2.40^{B}	2.53^{A}	2.47^{A}	2.51^{A}	
Daily feed intake 30 – 112 kg					
LS Mean (kg/day)	2.42^{B}	2.64^{A}	2.50^{B}	2.52^{B}	

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Description of growth traits per period

- **Daily feed intake (g/day)**
  - Per period:
    - ADG 30 – 50 kg (g/day)
    - ADG 50 – 75 kg (g/day)
    - ADG 75 – 112 kg (g/day)
- **Feed conversion ratio (kg/kg)**
  - Per period:
    - FCR 30 – 50 kg (kg/kg)
    - FCR 50 – 75 kg (kg/kg)
    - FCR 75 – 112 kg (kg/kg)

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Performances of terminal lines for growth traits per period

Growth Performances	Duroc Sogéporc	EB5®	Genex Duroc	QBX™	Desired value
ADG 30 -50 kg (g/day)					>
LS Mean (g/d)	961^{A}	980^{A}	948^{A}	940^{A}	
ADG 50 -75 kg (g/day)					>
LS Mean (g/d)	998^{A}	1029^{A}	1013^{A}	994^{A}	
ADG 75 -112 kg (g/day)					>
LS Mean (g/d)	1103^{A}	1141^{A}	1094^{A}	1078^{A}	
FCR 30-50 kg					<
LS Mean	1.85^{B}	1.95^{A}	1.95^{A}	1.95^{A}	
FCR 50-75 kg					<
LS Mean	2.38^{C}	2.53^{A}	2.46^{BC}	2.48^{AB}	
FCR 75-112 kg					<
LS Mean	2.69^{B}	2.82^{A}	2.77^{AB}	2.83^{A}	

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Carcass quality

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Description of carcass classification measurements

- **Destron backfat** (target* between 13.6 and 23.5 mm)
- **Destron muscle depth**

Rendement	POIDS (kg)								
	0.1 69.9	70.0 74.9	75.0 79.9	80.0 84.9	**85.0 91.9**	**92.0 99.9**	100.0 102.9	103.0 107.9	108.0 999.9
1	40	80	100	106	**110**	**110**	106	100	80
2	40	80	106	109	**114**	**114**	110	104	80
3	40	80	102	106	**111**	**111**	110	102	80
4	40	80	98	102	**108**	**108**	106	98	80
5	40	80	96	98	**106**	**106**	104	96	80
6	40	80	94	96	**100**	**100**	98	94	80
7	40	80	90	92	**96**	**96**	94	90	80

- **Lean yield** (based on backfat and muscle depth)
- **Slaughter grid index (85 à 99.9 kg)**

* According to the Référence des marchés québécois (2003)

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Performances of terminal lines for carcass classification measurements

Carcass quality	Duroc Sogéporc	EB5®	Genex Duroc	QBX™	Desired value
Backfat Destron					**13.6 à 23.5**
LS Mean (mm)	16,54^{C}	21,56^{A}	19,61^{B}	19,10^{B}	
% within desired range	70.3 %	70.3 %	78.6 %	78.5 %	
Muscle depth Destron					
LS Mean (mm)	65.07^{A}	62.59^{A}	64.94^{A}	63.91^{A}	
Lean yield					
LS Mean (%)	61.81^{A}	59.52^{C}	60.44^{B}	60.60^{B}	
Slaughter grid index (85 – 99.9 kg)					**>**
LS Mean	111.74^{A}	109.24^{C}	110.27^{B}	110.66^{B}	

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Description of carcass quality measurements

Off-test backfat and muscle depth

Ultrasound measurements (US)

Loin eye area

(target* between 43 et 47 cm²)

Carcass yield

hot carcass weight / off-test weight

* According to Référence des marchés québécois (2003)

Performances of terminal lines for carcass quality measurements

Carcass quality	Duroc Sogéporc	EB5®	Genex Duroc	QBX™	Desired value
Final backfat (US)					
LS Mean (mm)	13.73^{C}	17.81^{A}	16.16^{B}	15.56^{B}	
Final muscle depth					
LS Mean (mm)	63.96^{A}	62.07^{A}	64.41^{A}	62.76^{A}	
Loin eye area					**43 to 47**
LS Mean (cm^2)	45.16^{A}	42.57^{A}	44.63^{A}	43.62^{A}	
% within desired range	33.1 %	31.1 %	33.3 %	38.6 %	
Carcass yield					**>**
LS Mean (%)	79.37^{B}	80.08^{A}	80.15^{A}	80.07^{A}	

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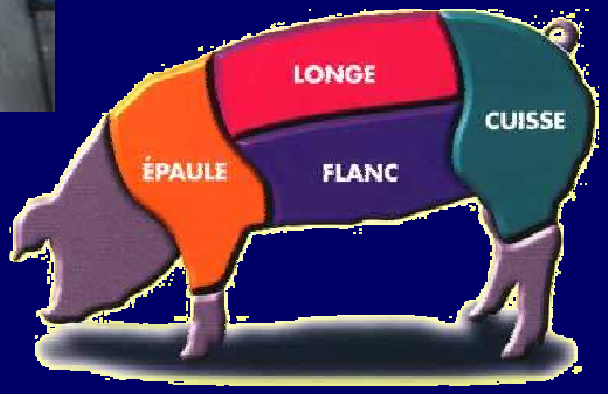
Description of carcass quality measurements

- **Primal cuts yield**

Primal cut weight / Reconstituted half carc.



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Performances of terminal lines for carcass quality measurements

Primal cuts	Duroc Sogéporc	EB5®	Genex Duroc	QBX™
Ham yield (%)	26.89^{A}	26.04^{B}	26.71^{A}	26.83^{A}
Loin yield (%)	25.92^{AB}	26.16^{A}	25.76^{AB}	25.41^{B}
Shoulder yield (%)	28.85^{AB}	28.47^{B}	28.78^{AB}	28.91^{A}
Belly yield (%)	18.34^{C}	19.33^{A}	18.77^{BC}	18.83^{B}

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Meat quality

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Description of loin quality measurements

Ultimate pH 24 h
(>)

Luminosity
(<)

Color
(3 to 4)

(Desired values)

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Performances of terminal lines for loin quality measurements

Loin quality	Duroc Sogéporc	EB5®	Genex Duroc	QBX™	Desired value
Ultimate pH 24 h					>
LS Mean	5.68^{A}	5.67^{A}	5.68^{A}	5.66^{A}	
Luminosity					<
LS Mean	51.06^{A}	51.20^{A}	51.33^{A}	51.42^{A}	
Color (Japanese scale)					3 to 4
LS Mean	3.52^{A}	3.58^{A}	3.56^{A}	3.58^{A}	
% within desired range	95.4 %	97.0 %	96.2 %	95.1 %	

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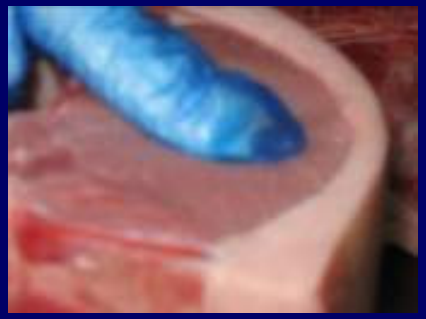
Description of loin quality measurements

Texture



1 : firm
2 : medium
3 : soft
(<)

Marbling

2

to

4

(Desired values)

Drip loss

(<)

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Performances of terminal lines for loin quality measurements

Loin quality	Duroc Sogéporc	EB5®	Genex Duroc	QBX™	Desired value
Texture					<
LS Mean	1.44^{A}	1.33^{A}	1.34^{A}	1.47^{A}	
Marbling (NPPC scale)					2 to 4
LS Mean	2.56^{A}	2.71^{A}	2.81^{A}	2.60^{A}	
% within desired range	88.3 %	92.5 %	93.2 %	92.1 %	
Drip loss					<
LS Mean (%)	3.11^{A}	3.54^{A}	3.28^{A}	3.70^{A}	

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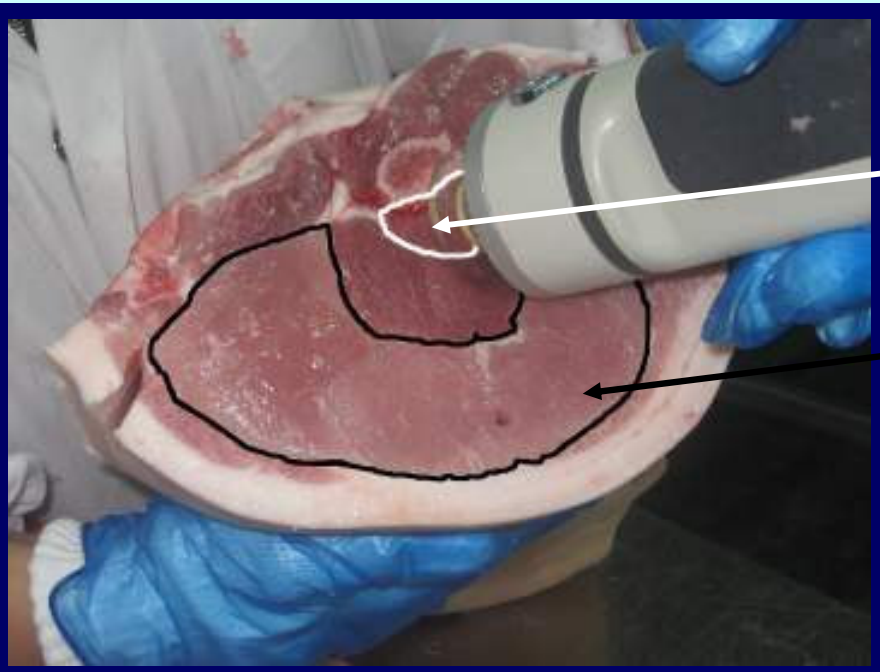
Description of ham quality measurements



Gluteus profundus

Gluteus medius
- Ultimate pH 24 h (>)
- 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* (>)

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Performances of terminal lines for ham measurements

Ham quality	Duroc Sogéporc	EB5®	Genex Duroc	QBX™	Desired value
Ultimate pH24 h					>
LS Mean	5.63^{B}	5.63^{B}	5.68^{A}	5.65^{AB}	
Luminosity					<
LS Mean	49.65^{A}	49.37^{A}	49.21^{A}	48.47^{A}	
Color (japanese scale)					>
LS Mean	3.52^{B}	3.56^{AB}	3.56^{AB}	3.70^{A}	

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Performances of terminal lines for ham quality measurements

Ham quality	Duroc Sogéporc	EB5®	Genex Duroc	QBX™	Desired value
Bicoloration					<
LS Mean	1.57[A]	1.53[A]	1.56[A]	1.43[A]	
Technological yield					>
LS Mean	129.20[A]	129.27[A]	128.88[A]	129.11[A]	

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Description of belly texture measurement

- Boneless belly draping over a metallic rod for a period of 2 minutes
- Distance at 15 cm from the rod

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Performances of terminal lines for belly quality measurement

Belly quality	Duroc Sogéporc	EB5®	Genex Duroc	QBX™	Desired value
Belly texture					
LS Mean	144.06^{B}	180.02^{A}	168.62^{A}	170.18^{A}	

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More results

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Gender performances

Growth Performances	Barrows	Females	Sex diff.
Off-test age* (day)	**143.2**	**150.9**	**-7.7**
ADG 30-112 kg (g/day)*	**1077**	**984**	**93**
Off-test backfat (US)* (mm)	**17.21**	**14.42**	**2.79**
Off-test muscle depth (US)*(mm)	**62.71**	**63.90**	**-1.19**

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

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Gender performances

Carcass and meat quality measurements	Barrows	Females	Sex diff.
Carcass yield* (%)	**79.65**	**80.18**	**-0.53**
Ham yield* (%)	**26.34**	**26.89**	**-0.55**
Loin yield* (%)	**25.71**	**25.92**	**-0.21**
Shoulder yield* (%)	**29.09**	**28.41**	**0.68**
Loin texture*	**1.32**	**1.47**	**-0.15**

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

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Health performances

Mortality reasons

	Trial 21		Trial 22	
	Nursery	Finishing	Nursery	Finishing
Bad condition [1]	0	0	1	0
Wasting	0	0	2	1
Locomotion troubles	1	0	0	1
Respiratory troubles	0	0	1	0
Sudden death	2	0	3	3
Meningitis	1	0	0	0
Other conditions	0	2	0	3
Total number (%)	**4/352 (1.13%)**	**2/348 (0.57 %)**	**7/344 (2.03 %)**	**8/337 (2.37 %)**

[1] Piglets in bad condition at starting (0-3 days)

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Nursery performances

Table of piglets performances during the acclimatization period:

Diet	Age (days)	Weight (kg)	ADG (g/day)	Feed intake
1	13.5 to 23.9	5.3 to 6.6	123	1.321
2	23.9 to 28.9	6.6 to 8.3	342	1.181
3	28.9 to 39.4	8.3 to 13.8	519	1.264
4	39.4 to 68.9	13.8 to 33.1	652	1.644
Global	13.5 to 68.9	5.3 to 33.1	498	1.525

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Warning: not relevant to compare terminal lines performances between tests

Trait	Results	Trial 19	Trial 20	Trial 21	Trial 22
Average daily gain (g/day)	By trial	1077	1003	1047	1020
	By test	1038		1030	
Off-test backfat (US) (mm)	By trial	15.04	13.57	15.14	16.52
	By test	14.36		15.81	

More differences of performances within each test (between trials) than between tests

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Conclusion

- **The 21st and 22nd station trials have showed:**
  - Differences of performances for the 4 sire lines :
    - Growth performances
    - Carcass quality
    - Meat quality

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To come…

- **The next trials in station (23rd et 24th) will test 3 new terminal lines:**
  - The Duroc from Alliance Duroc;
  - The PIC 280 from PIC Canada Ltd;
  - The Rock-Y from Hypor Inc.

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  - **Joël Rivest**
- Health protocol and follow-up:
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- Feeding protocol:
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  - Ferme du Bras
  - Ferme Guy Lord
  - Ferme Izalco s.e.n.c
  - Ferme Jacques Ouellet inc.
  - Ferme La Ronchonnerie inc.
  - Ferme La Seigneurie
  - Ferme Loulouporcs
  - Ferme M-1500
  - Ferme Magella Duclos et Carole Turgeon
  - Ferme Mario Mathieu
  - Ferme Maxlie
  - Ferme Purporc
  - Ferme René Gauthier inc.
  - Ferme Ste-Catherine
  - Ferme Sylmar enr.
  - Ferme Ursuporc
  - Les Élevages Lessard inc.
  - Maternité St-Samuel
  - Porcherie Roger Gauthier inc.
  - Soliporc s.e.n.c.

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  - S.C.A. La Seigneurie de St-Narcisse de Beaurivage
  - Sogéporc inc.

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