



23rd and 24th station trials



Evaluation of terminal lines DUROC, PIC 280 and ROCK-Y



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développement du
porc du Québec inc.

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May 2009



Outline



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



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



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

- Two commercial trials

Trial 23

November 2007



Trial 24

May 2008

May 2008



October 2008

- Terminal lines test
- 3 participating organizations





Description of the test



Sire lines	Participating organizations
DUROC	Alliance Duroc
PIC 280	PIC Canada Ltd.
ROCK-Y	Hypor inc.



Description of the test



Boars:
Duroc, PIC 280, ROCK-Y
(≈ 20 sires per line)

X

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



Hogs in test station
(452 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

Specificities 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



Growth Performances



Description of growth traits

- **Test period**

- On-test weight: 32.38 kg
- Off test weight: 116.18 kg

- **Performance of terminal lines**

	Duroc	PIC 280	ROCK-Y
On-test weight* (kg)	32.66 ^A	33.22 ^A	31.28 ^B
Off-test weight (kg)	116.46 ^A	116.47 ^A	115.61 ^A

* Significant difference between lines

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





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



Performances of terminal lines for growth traits



Growth Performances	Duroc	PIC 280	Rock-Y	Desired value
Off-test Age				<
LS Mean (day)	151.5 ^A	148.8 ^B	154.1 ^A	
ADG 30-115 kg				>
LS Mean (g/d)	1023 ^A	1053 ^A	987 ^B	





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




Performances of terminal lines for feed intake



Growth Performances	Duroc	PIC 280	Rock-Y	Desired value
Total feed intake 30 – 115 kg				<
LS Mean (kg)	204.4 ^A	197.3 ^B	203.9 ^A	
Feed conversion ratio. 30 – 115 kg				<
LS Mean (kg/kg)	2.44 ^A	2.36 ^B	2.44 ^A	
Daily feed intake 30 – 115 kg				
LS Mean (kg/day)	2.46 ^A	2.45 ^A	2.38 ^B	





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 – 115 kg (g/day)
- **Feed conversion ratio (kg/kg)**
 - Per period:
 - FCR 30 – 50 kg (kg/kg)
 - FCR 50 – 75 kg (kg/kg)
 - FCR 75 – 115 kg (kg/kg)

Performances of terminal lines for growth traits per period



Growth Performances	Duroc	PIC 280	Rock-Y	Desired value
ADG 30-50 kg (g/day)				>
LS Mean (g/d)	974 ^A	978 ^A	933 ^B	
ADG 50-75 kg (g/day)				>
LS Mean (g/d)	997 ^{AB}	1020 ^A	964 ^B	
ADG 75-115 kg (g/day)				>
LS Mean (g/d)	1076 ^A	1131 ^A	1037 ^A	
FCR 30-50 kg				<
LS Mean	1.85 ^A	1.82 ^A	1.84 ^A	
FCR 50-75 kg				<
LS Mean	2.40 ^A	2.31 ^B	2.36 ^{AB}	
FCR 75-115 kg				<
LS Mean	2.82 ^A	2.71 ^B	2.82 ^A	





Carcass quality



Description of carcass classification measurements

- **Destron backfat (target* between 13.6 and 23.5 mm)**
- **Destron muscle depth**
- **Lean yield (based on backfat and muscle depth)**
- **Slaughter grid index (85 to 99.9 kg)**

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

* According to the Référence des marchés québécois (2003)



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Performances of terminal lines for carcass classification measurements



Carcass quality	Duroc	PIC 280	Rock-Y	Desired value
Backfat Destron				13.6 to 23.5
LS Mean (mm)	17.53 ^A	17.72 ^A	18.35 ^A	
% within desired range	83 %	77 %	83 %	
Muscle depth Destron				
LS Mean (mm)	67.14 ^A	63.88 ^B	67.01 ^A	
Lean yield				
LS Mean (%)	61.46 ^A	61.19 ^A	61.06 ^A	
Slaughter grid index (85 – 99.9 kg)				>
LS Mean	111.8 ^A	111.4 ^A	111.1 ^A	

Description of carcass quality measurements



Off-test backfat and muscle depth

Ultrasound measurements (US)



Loin eye area
(target* between 43 and 47 cm²)

* According to Référence des marchés québécois (2003)





Description of carcass quality measurements



Carcass yield

Hot carcass weight / Off test weight



Half-carcass length

Foster rule (cm)





Performances of terminal lines for carcass quality measurements

Carcass quality	Duroc	PIC 280	Rock-Y	Desired value
Carcass length				
LS Mean (cm)	83.20 ^A	83.13 ^{AB}	82.19 ^B	
Final backfat				
LS Mean (mm)	14.92 ^A	15.00 ^A	15.47 ^A	
Final muscle depth				
LS Mean (mm)	66.11 ^A	63.47 ^B	64.96 ^{AB}	
Loin eye area				43 to 47
LS Mean (cm ²)	50.19 ^A	46.22 ^B	50.17 ^A	
Proportion dans la bonne strate	21 %	38 %	20 %	
Carcass yield				>
LS Mean (%)	80.48 ^B	79.94 ^C	81.32 ^A	





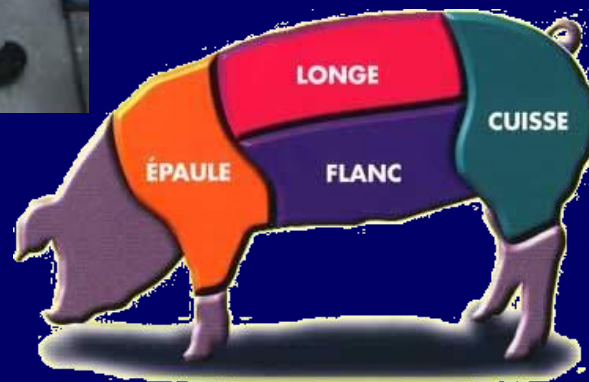
Description of carcass quality measurements

- Primal cuts yield

Primal cut weight

/

Reconstituted half carc.



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Performances of terminal lines for carcass quality measurements



Primal cuts	Duroc	PIC 280	ROCK-Y
Ham yield (%)	26.71^A	26.36^B	27.01^A
Loin yield (%)	27.26^A	26.95^A	27.21^A
Shoulder yield (%)	27.41^B	27.92^A	27.42^B
Belly yield (%)	18.66^A	18.75^A	18.39^A



Meat quality



Description of loin quality measurements



Ultimate pH 24 h
(>)



Luminosity
(<)



Color
(3 to 4)

(Desired values)



Performances of terminal lines for loin quality measurements



Ham quality	Duroc	PIC 280	Rock-Y	Desired value
Ultimate pH24 h				>
LS Mean	5.64 ^A	5.62 ^A	5.65 ^A	
Luminosity				<
LS Mean	50.68 ^A	50.10 ^A	49.64 ^A	
Color (japanese scale)				>
LS Mean	3.58 ^A	3.56 ^A	3.59 ^A	





Description of loin quality measurements



Texture



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

Marbling



2



to

4

(Desired values)

Drip loss



(<)





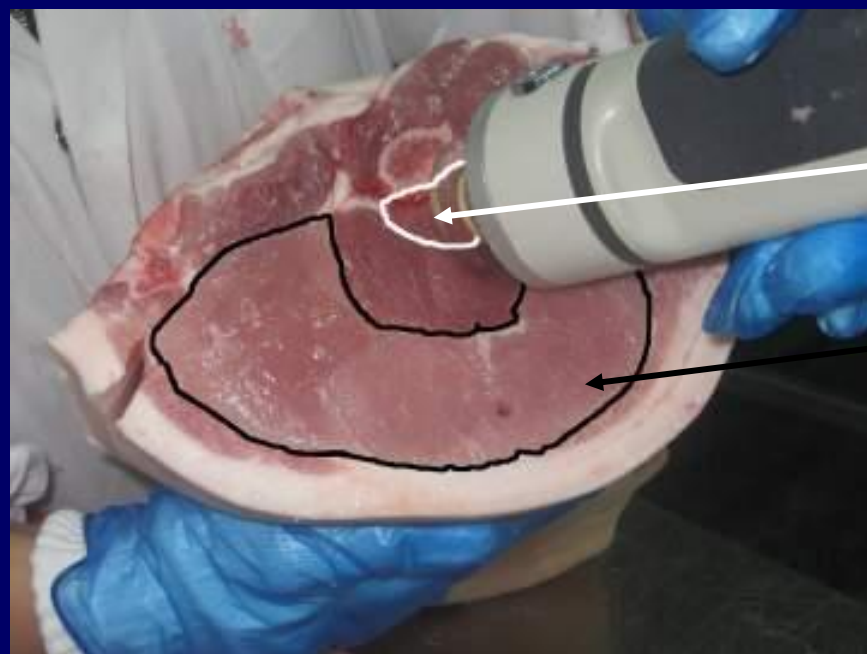
Performances of terminal lines for loin quality measurements



Loin quality	Duroc	PIC 280	Rock-Y	Desired value
Texture				<
LS Mean	1.76 ^A	1.76 ^A	1.42 ^B	
Marbling (NPPC scale)				2 to 4
LS Mean	2.82 ^A	2.77 ^A	2.56 ^A	
% within desired range	92 %	91 %	88 %	
Drip loss				<
LS Mean (%)	3.70 ^A	3.33 ^A	3.71 ^A	



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* (>)





Performances of terminal lines for ham measurements

Ham quality	Duroc	PIC 280	Rock-Y	Desired value
Ultimate pH24 h				>
LS Mean	5.64 ^A	5.62 ^A	5.65 ^A	
Luminosity				<
LS Mean	50.68 ^A	50.10 ^A	49.64 ^A	
Color (japanese scale)				>
LS Mean	3.58 ^A	3.56 ^A	3.59 ^A	



Performances of terminal lines for ham quality measurements

Ham quality	Duroc	PIC 280	Rock-Y	Desired value
Bicoloration				<
LS Mean	1.81 ^A	1.78 ^A	1.86 ^A	
Technological yield				>
LS Mean	129.6 ^A	130.1 ^A	129.6 ^A	

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





Performances of terminal lines for belly quality measurement



Belly quality	Duroc	PIC 280	Rock-Y	Desired value
Belly texture				
LS Mean	145.7 ^{AB}	139.9 ^B	153.5 ^A	





More results



Gender performances

Growth Performances	Barrows	Females	Sex diff.
Off-test age* (day)	148.7	154.3	-5.6
ADG 30-115 kg (g/day)*	1056	986	70
Off-test backfat DESTRON* (mm)	19.48	16.25	3.23
Off-test backfat DESTRON *(mm)	64.99	67.04	-2.05

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



Gender performances

Growth Performances	Barrows	Females	Sex diff.
Total feed intake * (kg)	204.6	199.1	5.6
Daily feed intake* (kg/j)	2.54	2.32	0.23
Feed conversion ratio*	2.45	2.38	0.07

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



Gender performances

Carcass and meat quality measurements	Barrows	Females	Sex diff.
Carcass yield* (%)	80.34	80.82	-0.56
Ham yield* (%)	26.42	26.97	-0.55
Shoulder yield* (%)	27.77	27.38	-0.39
Marbling score (%)	2.89	2.55	0.33
Loin texture*	1.56	1.73	-0.16

*Significativement différent ($p < 0,05$) entre les sexes

Health performances

Mortality reasons

	Trial 23		Trial 24	
	Acclimatization	Evaluation	Acclimatization	Evaluation
Bad condition ¹	0	0	0	0
Wasting	2	1	0	1
Locomotive problems	0	1	1	0
Respiratory problems	0	0	0	0
Sudden death	3	1	1	2
Meningitis	0	0	1	0
Others conditions	0	6	0	1
Total (%)	5/269 (1,86 %)	9/264 (3,41 %)	3/273 (1,10 %)	4/270 (1,48 %)

¹ Piglets in bad condition in starting up (0-3 days)



Nursery performances

Table of piglets performances during the acclimatization period:

Diet	Age (days)	Weight (kg)	ADG (g/day)	Feed intake
1	13.8 to 23.7	5.2 to 6.4	116	1.34
2	23.7 to 29.2	6.4 to 8.1	303	1.25
3	29.2 to 39.7	8.1 to 14.1	571	1.19
4	39.7 to 68.7	14.1 to 32.2	625	1.59
Global	13.8 to 68.7	5.2 to 32.2	490	1.47



Warning: not relevant to compare terminal lines performances between trials



Traits	Result	Test 19	Test 20	Test 21	Test 22	Test 23	Test 24
Average daily gain (g/d)	By test	1077	1003	1047	1020	1017	1027
	By trial	1038		1030		1022	
Off-test backfat (mm)	By test	15.04	13.57	15.14	16.52	15.03	15.35
	By trials	14.36		15.81		15.19	

More differences of performances within each trial than between trials.



Conclusion

- The 23rd and 24th station trials have showed:
 - Differences of performances for the 3 sire lines :
 - Growth performances
 - Carcass quality
 - Meat quality



To come...

- **The next trials at the Deschambault test station (25th and 26th) will evaluate 2 terminal lines :**
 - G Performer from Génétiporc inc.;
 - Shade Oak Premium Duroc from Shade Oak Swine Ltd.
- and 2 maternal lines :**
 - F1 SEPQ from Société des éleveurs de porcs du Québec
 - Fertilis F25 from Génétiporc inc.



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:**
 - Orientation committee of trial station of CDPQ and Frédéric Fortin
- **Application of protocol:**
 - Richard Mailhot, Jean-Paul Daigle, Louise Riendeau and production sector
- **Farm operations:**
 - Johanne Bilodeau, Louis Moffet and Jacques Lévesque
- **Statistical analysis:**
 - Joël Rivest
- **Health protocol and follow-up:**
 - Christian Klopfenstein and Réal Boutin
- **Feeding protocol:**
 - Robert Fillion





Acknowledgements

- **Commercial farms :**

- A. Gentes inc.
- Élevage du Six / Mario Côté inc.
- Élevages R. Cadorette
- Ferme À Porc Çà
- Ferme Brûlé / Patoine et frères inc.
- Ferme du Bras / Unicoop
- Ferme Fernand Ouellet inc.
- Ferme G.E.C. inc.
- Ferme Géni-Porc
- Ferme Magella Duclos et Carole Turgeon
- Ferme Mario Mathieu
- Ferme Martin Fortier
- Ferme Ste-Catherine / La Coop Seigneurie
- Ferme St-Étienne / Mario Côté inc.
- Ferme Sylmar enr.
- Les Maraîchers St-Gilles (1991) enr.
- Maternité 68 / Mario Côté inc.
- Maternité Pintendre / Alfred Couture Itée
- Porcherie Roger Gauthier inc.



Acknowledgements

- **Close collaborators:**

- Abattoir Aliments Asta inc. from Saint-Alexandre-de-Kamouraska
- Alliance en génétique porcine du Québec – Volet Duroc
- Agri-Marché Inc.
- Centre d'insémination porcine du Québec inc. (CIPQ)
- Cobiporc Québec
- Gène Alliance Inc.
- Hypor Inc.
- PIC Canada Ltd.
- S.C.A. La Seigneurie from St-Narcisse de Beaurivage