

Additional file 1. Farm survey data from nine cohorts in this study.

Cohort	1	2	3	4	5	6	7	8	9
Province	ON	ON	ON	ON	QC	QC	QC	QC	QC
System	conventional	rwa	conventional	conventional	rwa	rwa	rwa	conventional	conventional
<i>Farm Size</i>									
Sow	1040	600	-	350	400	240	155	540	500
Nursery	2953	2000	-	650	2000	900	475	1100	1760
Finisher	8526	5000	-	150	2000	1235	2000		6000
Replacement Gilts	126	50	-	30	120	10	10	40	40
Suckling	1948	1000	-	150	1000	480	475	1050	1200
Grower		-	-	450	3000	865		-	-
Boars	15	8	-	4	3	2	2	1	4
Farrow Spaces	200	108	-	-	94	42	48	105	195
Farrow Rooms	3	5	-	6	9	6	3	-	-
Dry Sow Spaces	800	528	-	6	-	198	140	364	350
Boar Spaces	15	8	-	1	-	2	2	1	4
Nursery Spaces		-	-	-	-	560	456	1100	1760
Nursery Rooms	14	8	-	7	6	7	-	-	-
Finisher Spaces	-	2 barns x 12 pens x 6 sorters	-	-	-	-	2004	1100	6000
Finisher Rooms	36		-	4	2-3 per barn	7			
Gilt Spaces	180	-	-	-	4	-	10	90	35
Gilt Pens	-	3	-	-	-	-	-	-	-
Gilt Rooms	-	-	-	-	-	1	-	-	-
Isolation Spaces	-	-	-	-	-	-	-	-	70

<u>Farm Metrics</u>									
Live Animal Entry	no	yes		no	yes	no	yes	yes	yes
Live Animal Type	-	gilts	-	-	gilts, boars	-	gilts, boars	gilts, boars, nursery, grow- finish	gilts
Quarantine Barn	no	no	-	-	no	-	yes	yes	yes
Multi-site Operation	yes	yes	-	no	yes	no	yes	yes	yes
Number of Sites	4	4	-	-	8	-	4	3	4
Number of breeding sites	-	1	-	-	1	-	1	1	1
Number Nursery Sites	-	1	-	-	2	-	1	1	1
Number grow-finish sites	-	2	-	-	5	-	2	1	2
Number of nursery-grow- finish sites	-	-	-	-	-	-	0	0	-
Animal Sourcing	-	single	-	-	single	single	single	single (farrowing), multi(nursery)	single
Continuous Flow	yes	yes	-	yes	yes	yes	yes	yes (farrowing), no (nursery and finishing)	yes
Barn - all in all out	no	-	-	no	-	no	no	no	no
Breeding - all in all out	no	-	-	no	no	no	no	no	no
Farrowing - all in all out	yes	yes	-	yes	yes	yes	yes	yes	yes
Nursery - all in all out	yes	yes	-	yes	no	yes	yes	yes	yes
Grower - all in all out	yes	-	-	no	yes	no	yes	yes	-
Finisher - all in all out	yes	no	-	no	yes	no	yes	yes	yes
Target market weight	123.377	109	-	-	130	125-135	135		130
Target market age	16		-	-	26	26	24	26	25
Source of replacement gilts	single	multi	-	single	multi	single	single	multi	multi

Source of boar	0	multi	-	single	multi	single	single	multi	single
source_semen	0		-	multi	multi	multi	single	multi	multi
#_pigs_sow_year	-	29.3	-	17.8	26.8	27.94	27.8	26.62	26.3
litter_size	-	13.4	-	12.7	15	13.7	14.08	12.68	13.12
preweaning_mortality	-	-	-	6.80%	18.7	15.9	14.5	12.34	15.52
postweaning_mortality	-	-	-	-	3	-	-	-	-
nursery_growfinish_mortality	-	-	-	-	4%	<5%	4%	4-5%	6%
days_to_market	-	-	-	-	190	192	163	182	175
Average market weight (kg)	-	109	-	-	135	125	135	125	130
Shower Out	yes	no	-	yes	no	no	no	no	no
Shower In	yes	no	-	yes	no	no	no	yes	yes
All In	no	yes	-	no	yes	-	yes	yes	yes
All Out	-	yes	-	no	yes	-	yes	yes	yes
Every Pig	-	no	-		no	-	yes	yes	yes
Wash - disinfect	yes	yes	-	yes	yes	yes	yes	yes	yes
Wash - farrowing	yes	yes	-	yes	yes	yes	yes	yes	yes
Wash - gestation	no	yes	-	no	no	no	no	no	no
Wash - nursery/weaning	yes	yes	-	yes	yes	yes	yes	yes	yes
Wash - grower	yes	no	-	no	yes	no	no	no	no
Wash - finisher	yes	no	-	no	yes	no	yes	yes	yes
Downtime between batches	yes	yes	-	no	yes	yes	yes	yes	yes
Days of downtime	2	4	-		4	2	7	7 to 10	7
Same downtime each stage	-	no	-	-	no	yes	yes	no	no

Controlling pig flow	-	-	-	-	clean truck requested for loading pigs on finishing sites	Transporter makes sure the pigs don't come back from the truck. The construction of the loading dock are so that there is very limited back flow.	2 people in farm and trucker in truck	Farrowing unit: truck to truck. One on farm truck that loads into another truck for transport; Nursery and finishing: narrow halls, multiple people	2 people in the farm and one on truck
New equipment	Disinfecting before entry	No rules	-	Empty room and disinfect afterwards	New if possible, no cleaning. Equipment for repairing gets a visual inspection without cleaning	Disinfection of all non-new equipment and tools if disinfection with liquid is possible	None really, but disinfection of equipment for maintenance	no	Disinfection and downtime of 24 hours before entering in barn
Feed Biosecurity measures	All delivered to one insulated location	Own guidelines	-	Drivers do not enter barn	feed in bags delivered to the farm, transfer to a boiler. Bulk feed delivered in an outdoor silo with automatic heater	no	no	no	no

Other Biosecurity Measures	-	-	-	Shower in and shower out, only semen is brought into the barn (no live animals)	Danish entries	Down time visitors - 36 hours; Truck for market pigs only comes on Monday and is visually inspected for hygiene. The bedding is only put in where the producer can see it.	Visitors must visit this barn before visiting other farms on the same day	-	none
Feed Type:									
Feed Supplier	Grand Valley, Wanstead (Corn)	Grand Valley	-	Floradale Feed Mill	Les nutriment Gillois inc.	Nutri-gene	Nutriment Gillois	Nutrition Athena	Alfred Couture
Dry Sow 1	mash	other (HMG)	-	pellet	mash	mash	mash	pellet	pellet
Dry Sow 2	mash	wet/dry	-	-	-	-	mash	-	pellet
Lactation	mash	-	-	pellet	mash	mash	mash, wet/dry	pellet	pellet
Nursery 1	pellet	pellet	-	pellet	pellet	mash	mash, wet/dry (in winter)	pellet	mash
Nursery 2	pellet	wet/dry	-	pellet	mash	mash	mash, wet/dry (in winter)	pellet	mash
Nursery 3	pellet	wet/dry	-	pellet	mash	mash	-	pellet	mash
Nursery 4		-	-	-	-	-	-	pellet	mash

Grow-Finish 1	pellet and liquid feed	other (HMG)	-	pellet	mash	mash	mash, wet/dry	wet/dry	pellets, wet/dry
Grow-Finish 2	pellet and liquid feed	other (HMG)	-	pellet	mash	mash	mash, wet/dry	wet/dry	pellets, wet/dry
Grow-Finish 3	pellet and liquid feed	other (HMG)	-	-	mash	-	mash, wet/dry	wet/dry	pellets, wet/dry
Grow-Finish 4	-	-	-	-	-	-	-	wet/dry	pellets, wet/dry
Age Nursery 1 (weeks)	-	-	-	4	3 to 5	3 to 4	4 to 7	3 to 4	4 to 5
Weight Nursery 1 (kg)	-	-	-	-	6.8	6 to 8	8 to 15	6 to 7.5	-
Ingredients Nursery 1	Ignite - Pellet	-	-	-	corn-soy	corn, soy, milk powder	corn-soy	corn, wheat, soya	corn, soy
Age Nursery 2 (weeks)	-	-	-	5	5 to 7	4 to 6	7 to 9	4 to 5.5	5 to 7
Weight Nursery 2 (kg)	-	-	-	-	8 to 12	8 to 12	15 to 23	7.5 to 12	-
Ingredients Nursery 2	Optimize - Pellet	-	-	-	corn-soy	corn, soy	corn-soy	corn, wheat, soy	corn, soy
Age Nursery 3 (weeks)	-	-	-	6	7 to 10	6 to 10	-	5.5 to 8	7 to 9
Weight Nursery 3 (kg)	-	-	-	-	12 to 25	12 to 25	-	12 to 20	-
Ingredients Nursery 3	Respond - Pellet	-	-	-	corn-soy	corn, soy, and wheat residue	-	corn, wheat, soya	corn, soy

Age Nursery 4 (weeks)	-	-	-	-	-	-	-	8 to 10	9 to 10
Weight Nursery 4 (kg)	-	-	-	-	-	-	-	20 to 28.5	25
Ingredients Nursery 4	-	-	-	-	-	-	-	corn, wheat, soya	corn, soy
Age Grow-Finish 1 (weeks)	-	-	-	8	10 to 14	-	-	10 to 13	-
Weight Grow-Finish 1 (kg)	180	-	-	-	25 to 50	-	-	28.5 to 45	25 to 45
Ingredients Grow-Finish 1	Mash	-	-	-	corn-soy	corn, soy, and wheat residue	corn-soy	corn, wheat, soya	corn, soy
Age Grow-Finish 2 (weeks)		-	-	14	14 to 18	-	-	13 to 16	
Weight Grow-Finish 2 (kg)	32	-	-	-	50 to 75	-	-	45 to 65	45 to 65
Ingredients Grow-Finish 2	Mash	-	-	-	corn-soy	corn, soy, and wheat residue	corn-soy	corn, wheat, soya	corn, soy
Age Grow-Finish 3 (weeks)	-	-	-	-	18 to 22	-	-	16 to 21	
Weight Grow-Finish 3 (kg)	-	-	-	-	75 to 100	-	-	65 to 100	65 to 95
Ingredients Grow-Finish 3	-	-	-	-	corn-soy	corn, soy, and wheat residue	corn-soy	corn, wheat, soya	corn, soy

Age Grow-Finish 4 (weeks)	-	-	-	-	22 to 28	-	-	21 to 26	
Weight Grow-Finish 4 (kg)	-	-	-	-	100 to 135	-	-	100 to 125	95 to 130
Ingredients Grow-Finish 4	-	-	-	-	corn-soy	-	-	corn, wheat, soya	corn, soy
Creep Feed	yes	yes	-	yes	yes	yes	yes	yes	yes
Creep Feed Introduction (days old)	5	10	-	5	15	18	19	10	20
Creep Feed Ingredients	-	-	-	-	corn, soy	milk, corn, soy	-	-	corn and soy
<u>Feed Medication:</u>									
Feed Medication	yes	no	-	yes	no	no	no	yes	yes
Type - Dry Sow	-	-	-	-	-	-	-	Aureomycine 220	-
Dose - Dry Sow	-	-	-	-	-	-	-	3 kg/ton	-
Type - Lactation	Circo/Myco , Myco/Iron and Mly	-	-	Chlortetracycline	-	-	-	Aureomycine 220	Aivlosin
Dose - Lactation				220 mg/kg				4 kg/ton in first 2 weeks of lactation	1 kg/ton in week 1

Type - Nursery 1				Lincomycine 110				Aivlosin 17%	Sacox
Dose - Nursery 1				44 mg/kg				0.25 kg/ton in phases 1, 2, and 4	0.5 kg/ton in phase 3; 0.21 kg/ton in phase 4
Type - Nursery 2								Deracin 22%	Aureomycine 220
Dose - Nursery 2								2 kg/ton in phase 1, 2, and 4	2 kg/ton in phase 1 and 2
Type - Grow/Finish 1								Aivlosin 17%	Sacox
Dose - Grow/Finish 1								0.25 Kg/ton in phase 2	0.21 kg/ton for all phases
Type - Grow/Finish 2								Saccox 120	
Dose - Grow/Finish 2								0.21 kg/ton for all phases	
<u>Water Medication:</u>									
Water Medication	no	no	-	no	no	no	no	-	yes
Type - Dry Sow	-	-	-	-	-	-	-	-	-
Dose - Dry Sow	-	-	-	-	-	-	-	-	-

Type - Lactation	-	-	-	-	-	-	-	-	-
Dose - Lactation	-	-	-	-	-	-	-	-	-
Type - Nursery	-	-	-	-	-	-	-	-	Penicilline V
Dose - Nursery	-	-	-	-	-	-	-	-	20 mg/kg bodyweight in first week of nursery (week 4)
Type - Grow/Finish	-	-	-	-	-	-	-	-	-
Dose - Grow/Finish	-	-	-	-	-	-	-	-	-
Vegetarian Diet	no	yes	-	no	yes	yes	yes	yes	yes
Blood Plasma Protein	never	never	-	never	never	never	in the past	never	-
Diet reformulation (y/n)	-	-	-	no	no	yes	no	yes	no
Vaccine 1:									
Name	Circo/Myco Guard	Circo	-	Suvaxyn	Suvaxyn MH/HPS	Farrowsure B	Farrowsure B	Sequivity Influenza CérèsInfluenza	Ingelvac PRRS MLV
Disease	Circo/Myco	Circo	-	Mycoplasma	mycoplasma and glasser	Parvo, leptos, erysipelas	PLE	-	PRRS

Administration Method		IM	-	IM	IM	IM	IM	IM	IM
Administration Age	-		-	3 weeks and booster at 6 weeks	gilts + sows, 4 weeks pre-farrow	all sows every four months (February, June, October)	5 weeks prefarrow	All sows in August once per year (gilts have 2 shots in quarantine)	entry of gilts, others in August and February
Vaccine 2:			-						
Name	FarrowSure Gold B	Myco	-	Ingelvac Circo Flex	Fostera PCV	Litterguard	Prosystem RCE	Farrowsure Gold	Circumvent PCV M G2
Disease	parvo, erysipelas, lepto	Myco	-	Circovirus	circovirus	E.coli, Clostridium perfringens	E. coli, Clostridium difficile, Rotavirus A	Parvo, leptos, erysipelas	Circovirus, mycoplasma
Administration Method	-	IM	-	IM	IM	IM	IM	IM	IM
Administration Age	-		-	3 weeks	gilt+sows 3 weeks pre-farrow	all sows 5 and 2 weeks before farrowing	5 and 2 weeks prefarrow for gilts and 2 weeks prefarrow sows	All sows in September once per year (gilts get 1 shot in quarantine)	gilts before insemination , others 3-4 weeks before farrowing
Vaccine 3:									
Name	-	Lawsonia	-	litterguard LTC	litterguard LTC	RespiSure One	Circumvent PCV	ER bac plus	Farrowsure B
Disease	-	lawsonia	-	E. coli	ecoli, clostridium	Mycoplasma hyopneumoniae	Circovirus	Erysipelas	Parvovirus, Leptospirosis , Erysipelas

Administration Method	-	0	-	0		0	0	0	0
Administration Age	-	-	-	5 weeks and 2 weeks pre farrow	gilts+sows, 3 weeks pre farrow	second week in nursery	1 dose before first insemination	6 weeks before farrowing	gilts 2 doses before insemination , others 6-8 weeks before farrowing
Vaccine 4		-							
Name	-	-	-	Farrow Sure Gold B	Ingelvac PRRS MLV	Circovac	Circumvent PCV	Porcine pillishield	Porcine pillishield
Disease	-	-	-	Parvovirus	PRRS	PCV 2	Circo virus	E. coli	E. coli
Administration Method	-	-	-	0	0	0	0	0	0
Administration Age	-	-	-	replacement gilts before breeding and weaned sows before breeding	females, twice/year	second week in nursery	21 days of age	5 weeks pre farrowing for gilts, 3 weeks pre farrowing for all sows	gilts 4 and 2 weeks before farrowing
Vaccine 5									
Name	-	-	-	-	Circovac	Enterisol ileitis	Coliprotec F4	Ingelvac PRRS MLV	Sequivity influenza, Flusure XP
Disease	-	-	-	-	circovirus	Lawsonia	E coli	PRRS	Influenza
Administration Method	-	-	-	-	0	2	2	0	0

Administration Age	-	-	-	-	3	sixth week of nursery	21 days of age	All sows in September once a year (gilts get 1 shot in quarantine)	Sequivity in March and August, Flusure 3 weeks later
Administration Weight (kg)	-	-	-	-	6	-	-	-	-
Vaccine 6	-	-	-	-	-	-	-	-	-
Name	-	-	-	-	Respisure one	-	-	Respisure one Porcillis Ileitis Circumvent PCV2	Circumvent PCV, Porcilis, Respisure-1
Disease	-	-	-	-	mycoplasma	-	-	Mycoplasma hyopneumoniae, Lawsonia, Ileitis, circovirus	Circovirus, Ileitis, mycoplasma
Administration Method	-	-	-	-	0	-	-	0	0
Administration Age	-	-	-	-	3	-	-	At weaning and 3 weeks later for all piglets	at weaning and 4 weeks later
Administration Weight (kg)	-	-	-	-	-	-	-	-	-
Vaccine 7									

Name	-	-	-	-	Enterisol ileitis	-	-	Ingelvac PRRS MLV	-
Disease	-	-	-	-	lawsonia	-	-	PRRS	-
Administration Method	-	-	-	-	2	-	-	0	-
Administration Age	-	-	-	-	10	-	-	3 weeks after weaning for all piglets	-
Administration Weight (kg)	-	-	-	-	40	-	-	-	-
Vaccine 8	-	-	-	-		-	-	-	-
Name	-	-	-	-	Ingelvac prrs MLV	-	-	-	-
Disease	-	-	-	-	PRRS	-	-	-	-
Administration Method	-	-	-	-	0	-	-	-	-
Administration Age	-	-	-	-	3	-	-	-	-
PRRSV stage	nursery	farrowing	-	-	Vaccine-like	gestation and farrowing	-	Farrowing and gestation	all
PRRSV Last Test	2019-04-30	10 years ago	-	-		29/04/2019	-	2017	29-9-2019
Lawsonia stage	-	nursery	-	-	finisher	finishing	-	-	-
Lawsonia Last Test	-	-	-	-	2017	not confirmed	-	-	-
Swine Dysentery Stage	-	-	-	-	0	-	-	-	-
Swine Dysentery Last Test	-	-	-	-		-	-	-	-
Salmonella Stage	-	-	-	-	0	-	-	-	-
Salmonella Last Test	-	-	-	-		-	-	-	-
Coccidiosis Stage	-	-	-	-	0	-	-	Suckling piglets	-

Coccidiosis Last Test	-	-	-	-	-	-	-	No tests	-
E. coli Stage	nursery	-	-	-	suckling piglets	suckling piglets	Nursery and finishing	-	-
E. coli Last Test	Jul-18	-	-	-	2017	2018-04-04	Jul-18	-	-
Rotavirus Stage	sows	-	-	-		suckling	-	nursery	suckling
Rotavirus Last Test	Jul-18	-	-	-		2018-04-04	-	Aug-16	31-03-2017
Clostridium perfringens Stage	-	-	-	-	suckling piglets	-	-	-	-
Clostridium Perfringens Last Test	-	-	-	-	2017	-	-	-	-
Other Diseases	-	myco circo	-	-	-	-	-	-	-
Other Stage	-	-	-	-	-	Influenza in all	Influenza and PCV	mycoplasma and influenza in sows	PCV2 in nursery
Other Last Test	-	-	-	-	-	not confirmed	Influenza in 2015, PCV 2 in 2016	2016	2018-03-05
Outbreaks in last year	yes	-	-	-	no	yes	yes	no	yes

Outbreak comments	PRRS 122-2 and have been dealing with RRRS 184 for some time. Fall of 2018 had myco break	-	-	-	-	PRRS (confirmed), E.coli (suspected), Influenza (suspected)	Lameness in suckling piglets	-	influenza in nursery, PRRS in nursery, rotavirus
suspected confirmed Outbreaks	no	-	-	-	-	-	no	-	Influenza and PRRS confirmed, Rotavirus not confirmed