NURSERY MANAGEMENT AND PERFORMANCE

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MANITOBA pork COUNCIL sask PORK ALBERTA PORK

OUTLINE

- Housing
  - Thermal requirements
  - Floor space allowance
  - On- versus off-site
- Feeding and nutrition
  - Amino acids
  - Energy
  - Feeder Management
  - Feed budget
- Piglet Management

NURSERY: PART OF A CONTINUUM

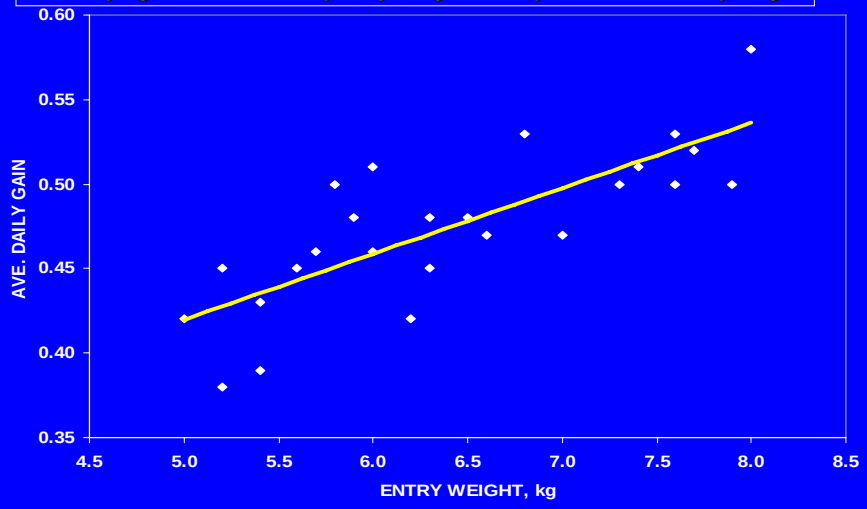
Farrowing

Nursery

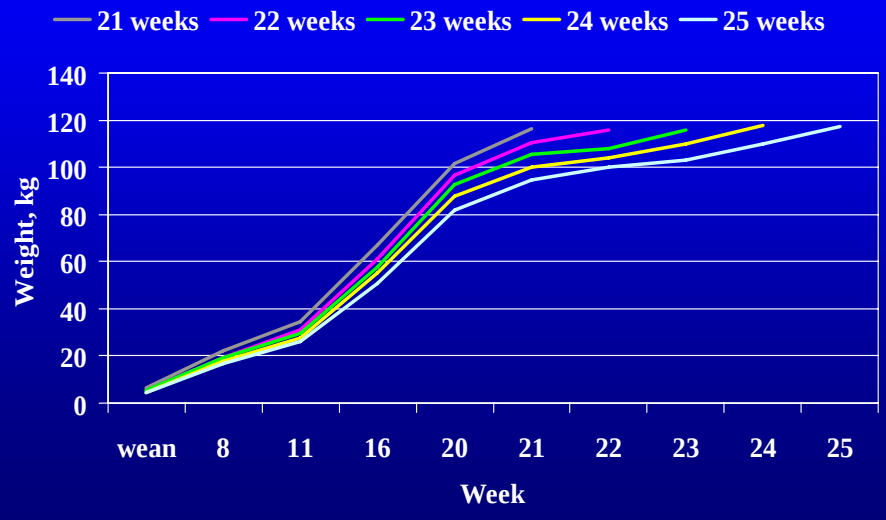
Growout

IMPACT OF START WEIGHT ON SUBSEQUENT GROWTH RATE

For every kg increase in nursery entry weight, nursery ADG increased by 40 g/d



GROWTH CURVES OF PIGS ACCORDING TO WEEK MARKETED : Males



Source: Cooper et al., 2001

GROWTH OF PIGS ACCORDING TO WEANING WEIGHT

Age	Week Marketed				
	21	22	23	24	25
			- kg -		
Number	49	71	113	115	62
21d	6.3	5.9	5.5	5.0	4.8
56d	22.8	20.9	20.0	18.8	17.5
77d	34.7	32.3	30.6	28.7	27.2
112d	68.3	64.5	61.3	57.3	53.7
140d	103.7	99.6	95.1	89.1	82.2

Another 32 pigs (25 females) did not reach minimum market weight (113 kg) by 25 weeks

Source: Cooper et al., 2001

IMPACT OF EARLY GROWTH ON SUBSEQUENT GROWOUT PERFORMANCE

For every kg increase in weight at weaning (21d), nursery exit weight (56d) increases by 1.9 kg.

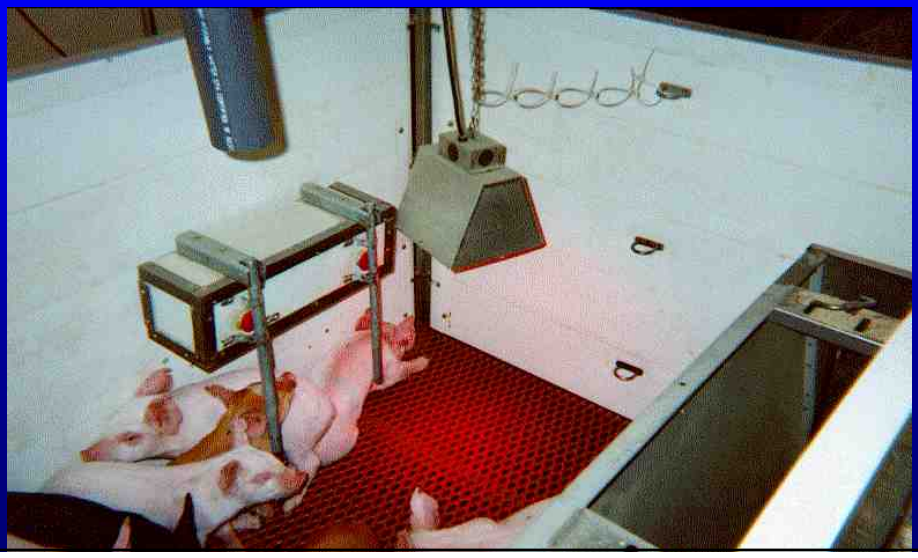
For every kg increase in weight at weaning (21d), weight at 20 weeks increases by 4.2 kg.

Source: Cooper et al., 2001

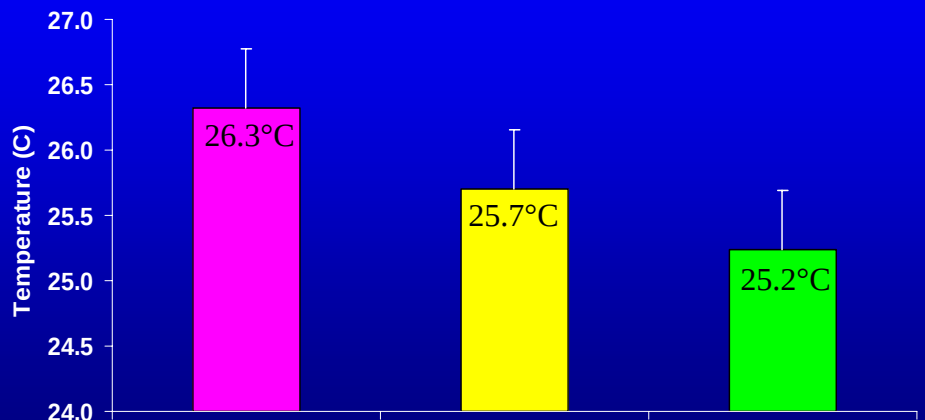
FACTORS AFFECTING THERMAL REQ'T

- Size and age of pig
- Feed intake
- Body heat losses
  - Convective: To air around the pig
  - Conductive: To floor and penning
  - Radiant: To cold "bodies" in the airspace

CONTROLLING PEN

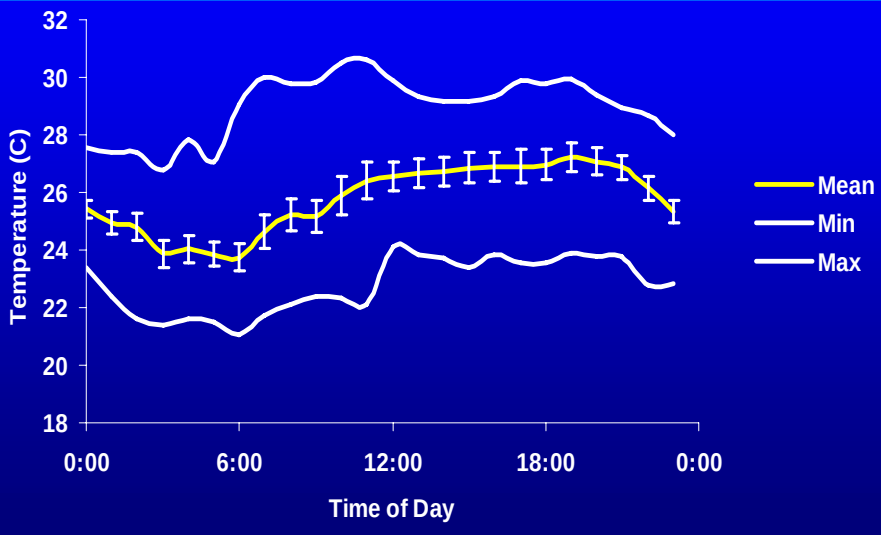


THERMAL PREFERENCES DETERMINED WEEKLY FOR PIGLETS WEANED AT 12 – 14 DAYS OF AGE



Source: Bench et al., 2001

PREFERRED TEMPERATURE RANGE OVER 24 HOURS, AVERAGED OVER 3 WEEKS



Source: Bench et al., 2001

FLOOR SPACE ALLOWANCE

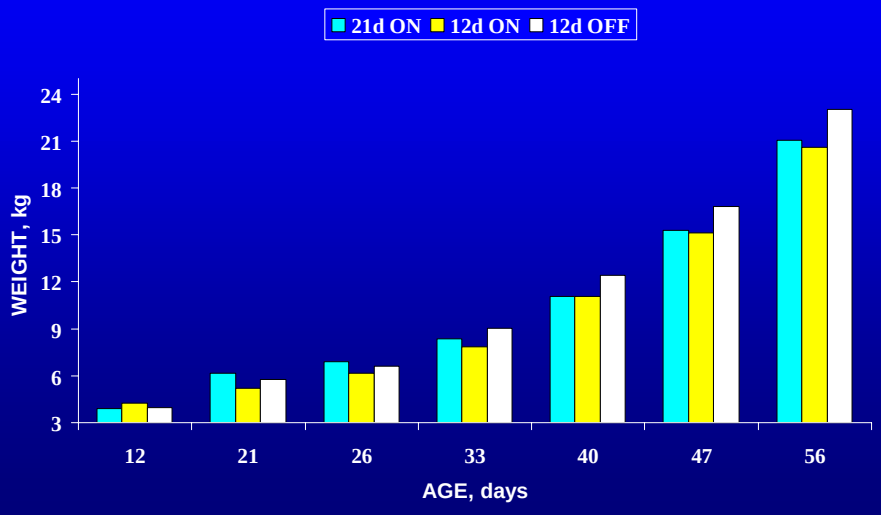
Density	2.50 ft^2/pig	3.00 ft^2/pig	3.75 ft^2/pig
No. Pigs	284	239	193
Initial wt., kg	7.03	7.10	7.09
Final wt., kg	28.03	29.39	29.69
CV for weight, %	17.1	16.0	15.8
Daily gain, kg*	0.495	0.518	0.531
Daily feed, kg*	0.737	0.765	0.786
Feed:gain	1.49	1.48	1.48

Pigs on test for 42 days, starting 8 days after weaning at 19 days of age. Pig density increased by placing 16, 20 or 24 pigs per pen; feeder access constant for all treatments.

* Effect of group size/density significant, P<0.05)

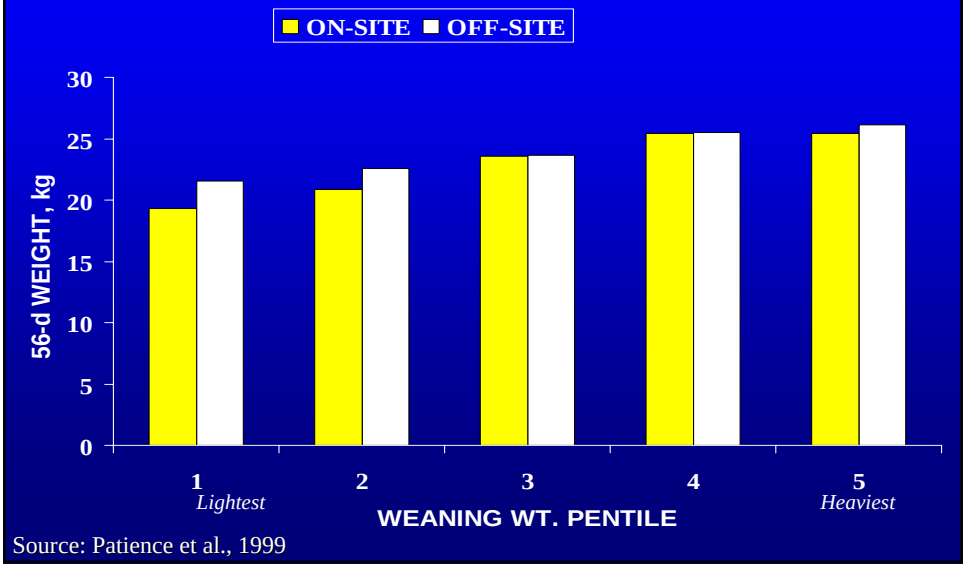
Source: Smith et al., 2001

IMPACT OF SITE OF WEANING ON NURSERY PERFORMANCE



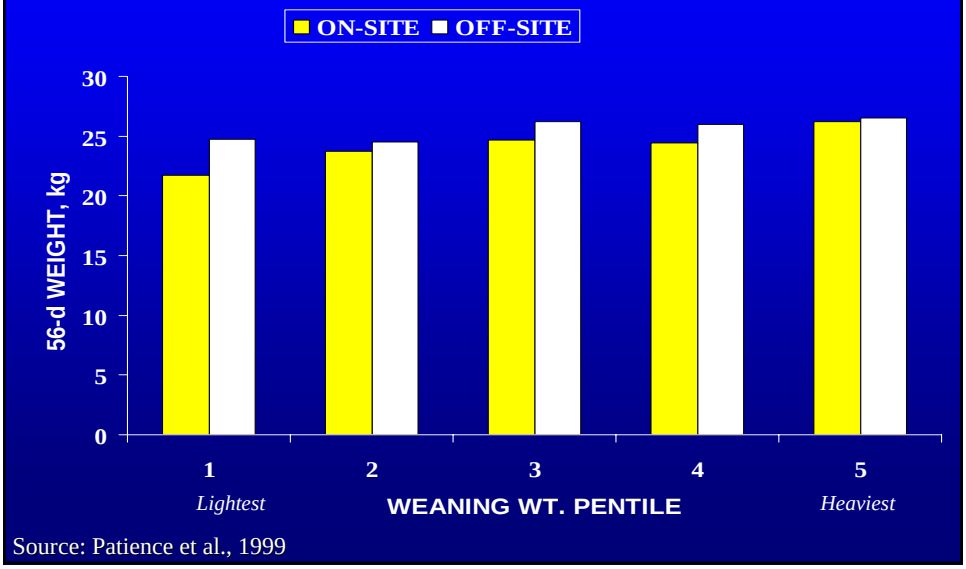
Source: Patience et al., 1997

IMPACT OF OFF-SITE WEANING AT 19 DAYS OF AGE ON 56-D PIGLET WEIGHTS ACCORDING TO WEANING WT.



Source: Patience et al., 1999

IMPACT OF OFF-SITE WEANING AT 14 DAYS OF AGE ON 56-D PIGLET WEIGHTS ACCORDING TO WEANING WT.

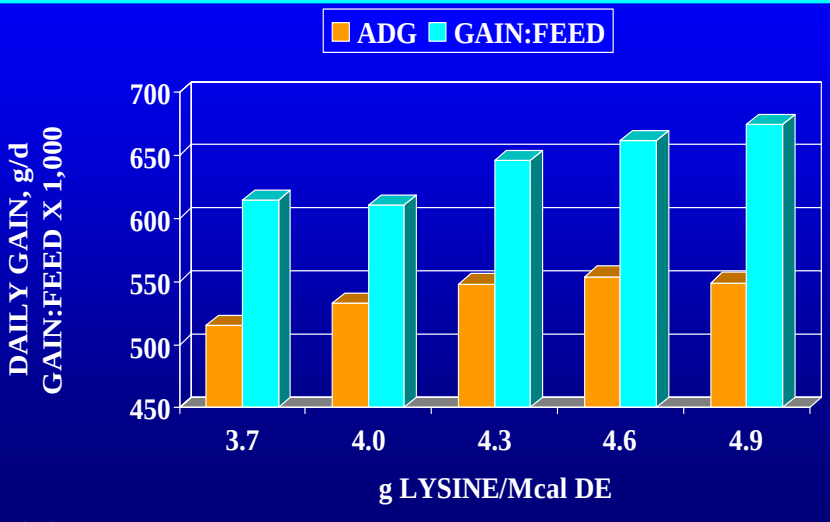


Source: Patience et al., 1999

FACTORIAL APPROACH TO CALCULTING AMINO ACID REQ'TS

- Represents only effective way to formulate diets for pigs of differing genetic potential managed under diverse environmental conditions across a wide range of economic circumstances.
- Approach works well with lysine, poorly (?) with energy; rarely attempted with other amino acids.
- Works best for weanling pigs where PDR can be more easily estimated; lack of effective approaches to defining PDR during growout represents serious barrier to effective implementation.

IMPACT OF LYSINE:DE RATIO ON WEANLING PIG PERFORMANCE



Pigs fed from 7.5 to 23 kg; diets contained 3.4 or 3.6 Mcal DE/kg; Source: Oresanya et al., 2002

LYSINE REQ'T FOR WEANLING PIGS: FACTORAL ESTIMATE

- Pig gaining 500 g/d has PDR of 80 g/d
- dLysine req't for PD is 0.14 g/g = 11.2 g/d (NRC, 1998)
- $dLYS_{Main}$ = 0.036 g/kg $BW^{0.75}$ = 0.27 g/d
- Total dLysine req't = 11.4 g/d
- tLysine req't = 13.4 g/d (digestibility = 85%)

- At typical feed intake, this corresponds to 1.5 to 1.6% total lysine

EFFECT OF SITE OF WEANING AT 17 DAYS OF AGE ON WEANED PIG PERFORMANCE

	ON	OFF	SEM
Initial wt., kg	5.31	5.35	
Final wt., kg[a]	21.28	23.41	0.12
ADG, kg/d[a]	0.42	0.48	0.003
ADFI, kg/d[a]	0.58	0.64	0.006
F:G	1.30	1.35	

[a]Effect of site significant, $P<0.05$.

Source: Levesque et al., 2002

EFFECT OF INCREASING DIETARY D.E. ON WEANLING PIG PERFORMANCE

DE	3,350	3,500	3,650	SEM
Initial wt., kg	6.65	6.56	6.54	0.04
Final wt., kg	23.07[a]	21.91[b]	22.00[b]	0.12
ADG, g/d	0.55[a]	0.51[b]	0.51[b]	0.004
ADFI, g/d	0.79[a]	0.72[b]	0.70[b]	0.005
F:G	1.43[a]	1.39[a,b]	1.35[b]	

[a,b]Within a row, means lacking a common superscript differ, P<0.05.

Source: Levesque et al., 2002

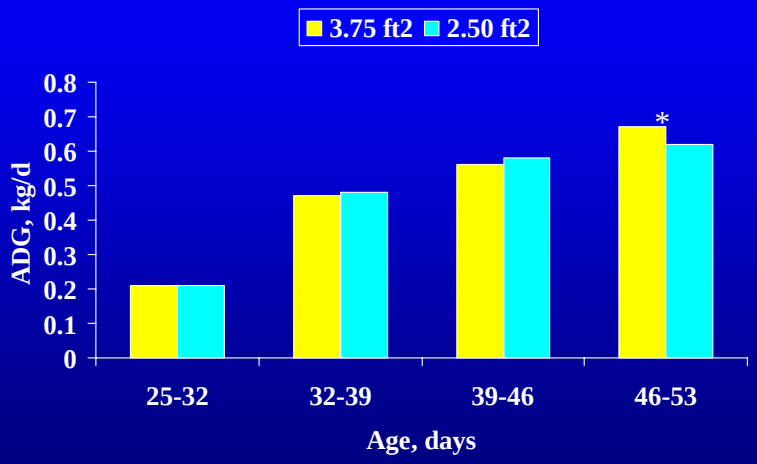
MEASURED VS. FORMULATED D.E. CONTENT OF DIETS

$DE_{form'd}$, kcal/kg	3,350	3,500	3,650	SEM
Digestibility, %	78.19[a]	82.14[b]	85.73[c]	0.57
$DE_{meas'd}$, kcal/kg	3049[a]	3322[b]	3579[c]	23.18
Difference, kcal	301	178	71	
Difference, %	9.0	5.1	2.0	

[a,b,c]Within a row, means lacking a common superscript differ, P<0.05.

Source: Levesque et al., 2002

EFFECT OF STOCKING DENSITY ON WEANLING PIG WEIGHT GAIN



* Means within the same floor space differ, P< 0.05

Source: Levesque et al., 2002

EFFECT OF INCREASING DIETARY D.E. ON WEANLING PIG PERFORMANCE

DE, kcal/kg	3,190	3,330	3,470	3,610	3,750	SEM
Initial wt, kg	6.56	7.01	6.63	6.79	6.49	
Final wt, kg	19.84[a]	20.11[a,b]	20.11[a,b]	20.41[b]	20.26[b]	.06
ADG, kg/d	0.47	0.47	0.48	0.49	0.47	.002
ADFI, kg/d	0.64[a]	0.64[a]	0.63[a]	0.63[a]	0.59[b]	.003
F:G	1.35[a]	1.33[a]	1.28[b]	1.27[b,c]	1.25[c]	

[a,b,c]Within a row, means lacking a common superscript differ, P<0.05.

Source: Levesque et al., 2002

MEASURED VS. FORMULATED D.E. CONTENT OF DIETS

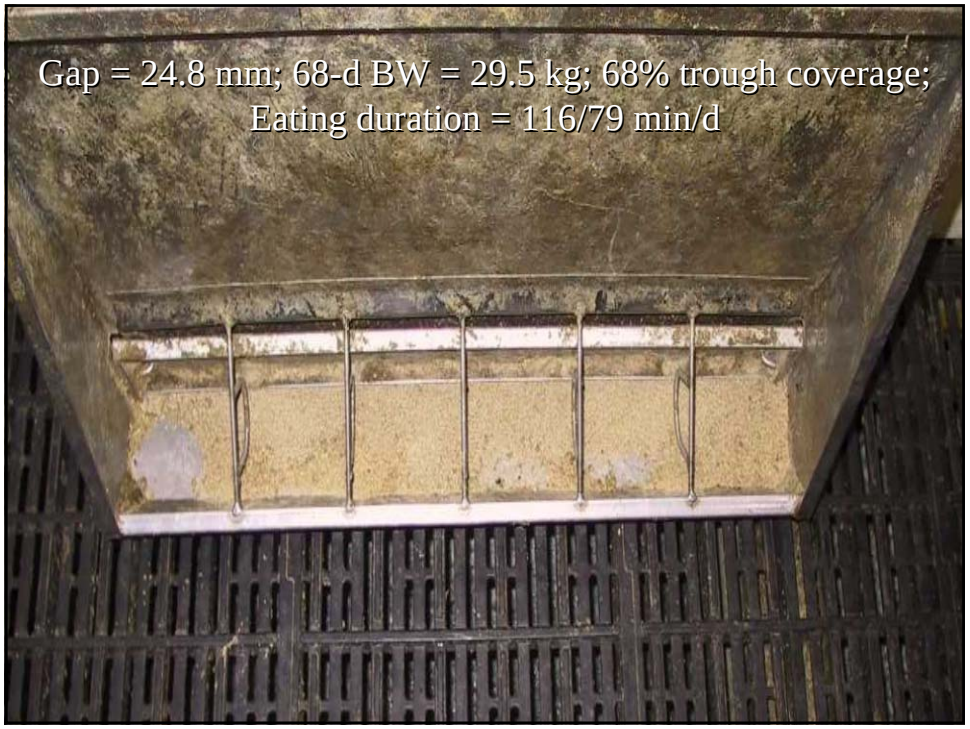
DE, kcal/kg	3,190	3,330	3,470	3,610	3,750	SEM
Digestibility, %	81.26[a]	81.76[a]	85.52[b]	85.20[b]	84.90[b]	0.15
$DE_{meas'd}$, kcal/kg	3,181	3,236	3,346	3,517	3,595	6
Difference, kcal	9	94	34	93	155	
Difference, %	0.3	2.8	1.0	2.6	4.1	

[a,b]Within a row, means lacking a common superscript differ, P<0.05.

Source: Levesque et al., 2002


Gap = 11.8 mm; 68-d BW = 29.0 kg; 12% trough coverage;
Eating duration = 118/90 min/d


Gap = 17.9 mm; 68-d BW = 29.6 kg; 37% trough coverage;
Eating duration = 125/85 min/d


Gap = 24.8 mm; 68-d BW = 29.5 kg; 68% trough coverage;
Eating duration = 116/79 min/d

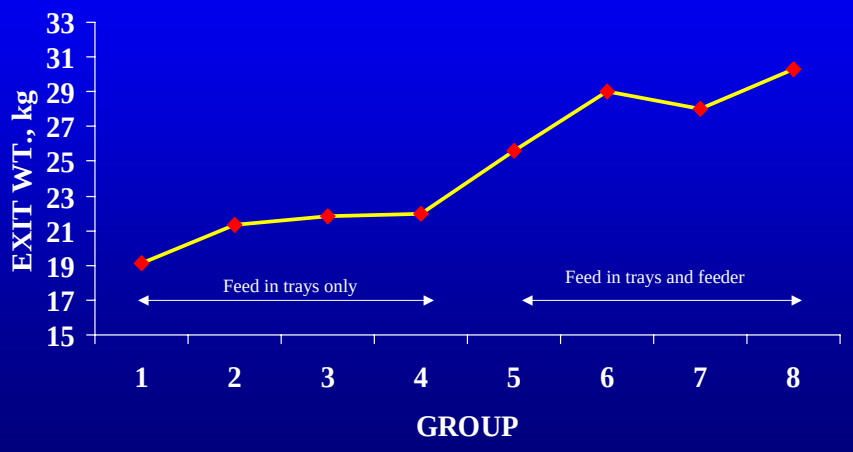

Gap = 31.5 mm; 68-d BW = 29.6 kg; 91% trough coverage;
Eating duration = 116/75 min/d

IMPACT OF FEED BUDGET MANAGEMENT ON NURSERY EXIT WT.

	Prior to Correction	Following Correction	Target
No. Turns	12	2	
No. Pigs	2,673	540	
Phase 1 diet, kg	0.4	2.0	2.0
Phase 2 diet, kg	15.4	18.8	17
Phase 3 diet, kg	23.7	22.3	24
Entry age, days	19.2	19.2	19
Exit age, days	71.2	72.2	72
Entry wt., kg	6.0	6.2	6.5
Exit wt., kg	30.5	34.2	35

The additional Phase 1 and 2 diets increased feed cost by $2.87/pig. The additional weight increased farrow-to-finish profit by $1.85/pig or $25,000 per year for 600 sow unit.

IMPACT OF NURSERY FEED MANAGEMENT 7-10 DAYS POSTWEANING ON NURSERY EXIT WEIGHTS



Source: Dritz et al., 1999

TAKE HOME MESSAGES

1. Preferred nursery temperatures may be lower than current practice
2. Crowding in the nursery, especially to less than 3 ft^2/pig, will result in economically important performance losses
3. Benefit of off-site weaning, even in high health circumstances, suggests the background pathogen load impairs piglet performance.
4. Amino acid requirements can be calculated factorially to ensure specific circumstances of individual farms can be attended to

TAKE HOME MESSAGES

5. Response to increased dietary D.E. may not be as great as previously thought.
6. Nursery feeders should be adjusted to provide minimum of 40% trough coverage
7. Feed budgets must be monitored, in terms of actual as opposed to expected intakes.

NO BOARED PIGS HERE!