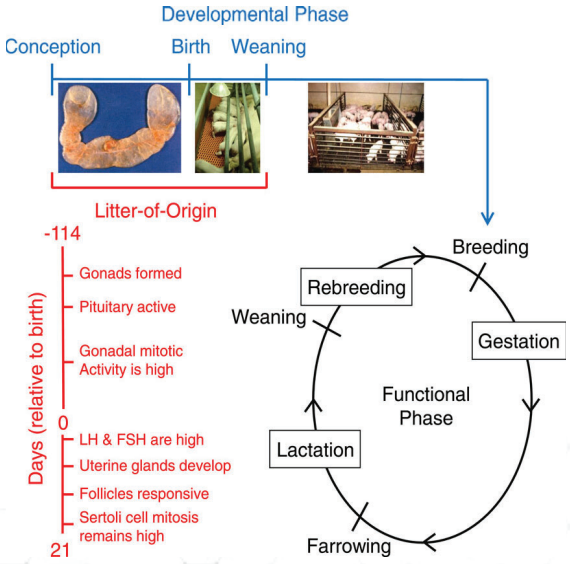
Important Considerations in Gilt Development

John Sonderman, PhD
Director of Technical Service
DNA Genetics

Overall gilt development strategy

- Impact on livability and reproductive performance starts EARLY
- Dedicated care to gilts (off-site development)
  - AIAO
- Square footage allotment to not restrict growth and reproduction
- Strategies for gilt development impact ability to get gilt in the herd in the first place
  - Better growth = better cycling
  - Earlier estrus detection = increased chance of crate acclimation and a skip
  - Crate acclimation and a skip = better lifetime performance
  - Better lifetime performance = increased longevity
- Care and consideration to weight at mating, HNS practices, crate acclimation, body condition, lactation intake

Litter-of-origin traits and their association with lifetime productivity in sows and boars



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Factors Early in life

- Organ development in utero (prior to birth)
- Birthweight
  - Several studies report that birthweights below 1 kg have an impact on the ability of the gilt to stay in the herd past her first litter
  - Other reports found no relationship
- Colostrum consumption
  - Piglets with higher serum levels of immunoglobulins tend to have higher lifetime performance (Vallet, et al., 2015)
- Prewean growth rates
  - Several studies have shown a positive relationship between preweaning growth rate and reproductive measures

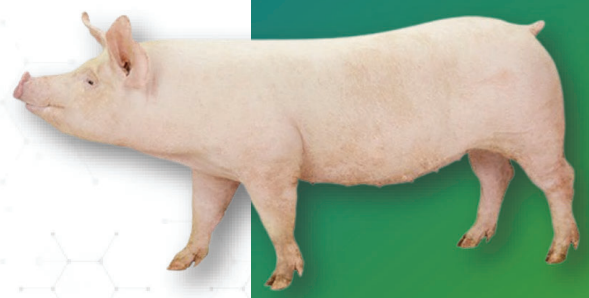
wean weight effect on reproduction

Weaning Weight Range	Count of Weaning Weight	Percentage Cycled	Percentage Bred
8-10	40	47.5%	10.0%
10.1-12	177	46.9%	12.4%
12.1-14	216	53.7%	21.8%
14.1-16	220	58.2%	30.5%
16.1-18	133	63.2%	40.6%
18.1-20	67	68.7%	44.8%
20.1+	43	72.1%	48.8%

Unpublished results from a commercial farm system, numbers as of 28 weeks of age

Practical considerations

- Avoid selecting low birth weight gilts for replacements
  - Less than 1 kg
- Day 1 pig care that involves getting the pig dry and, on a teat, may be beneficial in getting adequate colostrum
- Do not cross-foster gilts off the birth mother
- Adequate lactation feed intake will support better milk production and better prewean growth in offspring



Gilt development research

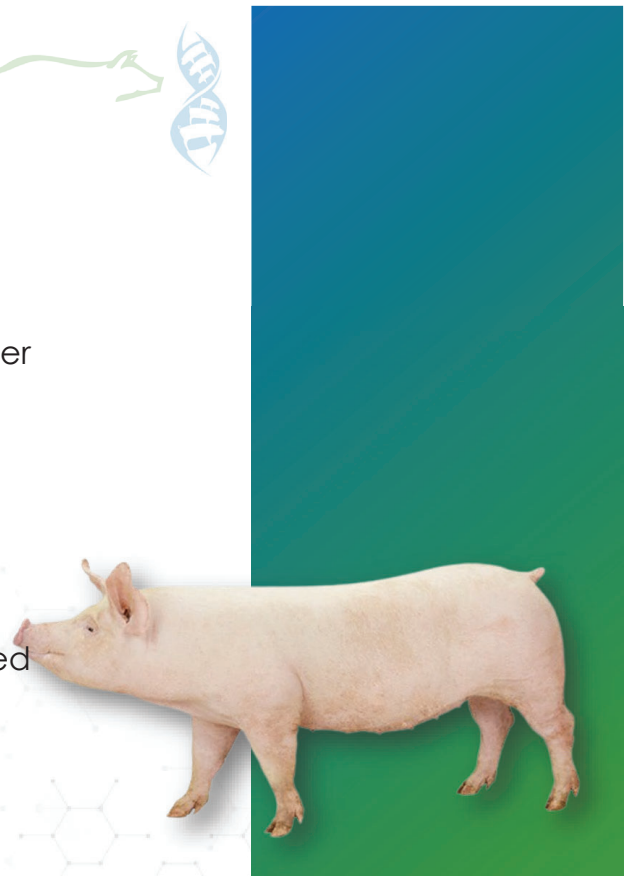
Pff gilt development – stocking density

Phase of Production	Site	Stocking Density (placement)	Stocking Density at (shipment)	Average Mortality
Nursery Off Site	Green Gables	3.7	3.7	5.39%
	Lost Valley	3.1	3.1	
Finisher Off Site	Crested Butte	8.3	14.0	
	Summit	8.3	14.0	
	Alpine	7.6	12.9	
	Hamill	6.4	10.9	
	Dimond	6.4	10.9	
Nursery On Site	On-site Nursery	3.0	Continuous flow	7.95%
Finisher On Site	On-Site Developer	8.5	Continuous flow	

Gilt Development Trial

- Objective
  - Observe impact of stocking density on gilt estrus & structure
    - 7.6 vs. 10 vs. 13.4 sqft/gilt at placement in finisher
      - 0.71 vs 0.93 vs 1.25 square meters/gilt

- Rationale:
  - Document growth rates and timing of estrus given different stocking densities
  - Does extra space & cost in GDU pay off in improved growth, structure and early maturing females?



Gilt Development trial

- Over 850 individual gilts enrolled
- Data Collection:
  - Heat Checking
    - Start at 20 weeks of age, daily
  - Progesterone Assays
    - 24, 26, 28 weeks of age (whole-herd)
    - 30 weeks of age (only animals without a recorded estrus)
  - Weights
    - Weaning
    - End of nursery
    - 24 weeks of age
    - Pen weights: 16, 20, 28, and 32 weeks of age
  - Structure
    - 1-3, end of nursery and 24 weeks of age
  - Biological Parameters
    - Serum, nasal swab, vaginal swab, rectal swab, urine – 45 animals

Results – finishing mortality

- No significant difference noted – too few numbers
- Do not see same trend as PFF Review – is nursery impact bigger component?

	7.6	10	13.4
Culls	1.70%	0.70%	1%
Total Mortality	4.70%	3.30%	4.00%
HBS	0.6%	0.7%	0%
Ulcer	1.1%	0.4%	0.50%
Lame	1.9%	0.4%	0.50%
Respiratory	0.8%	1.1%	2.50%
Unknown	0.3%	0.4%	0.50%

Results - Weights

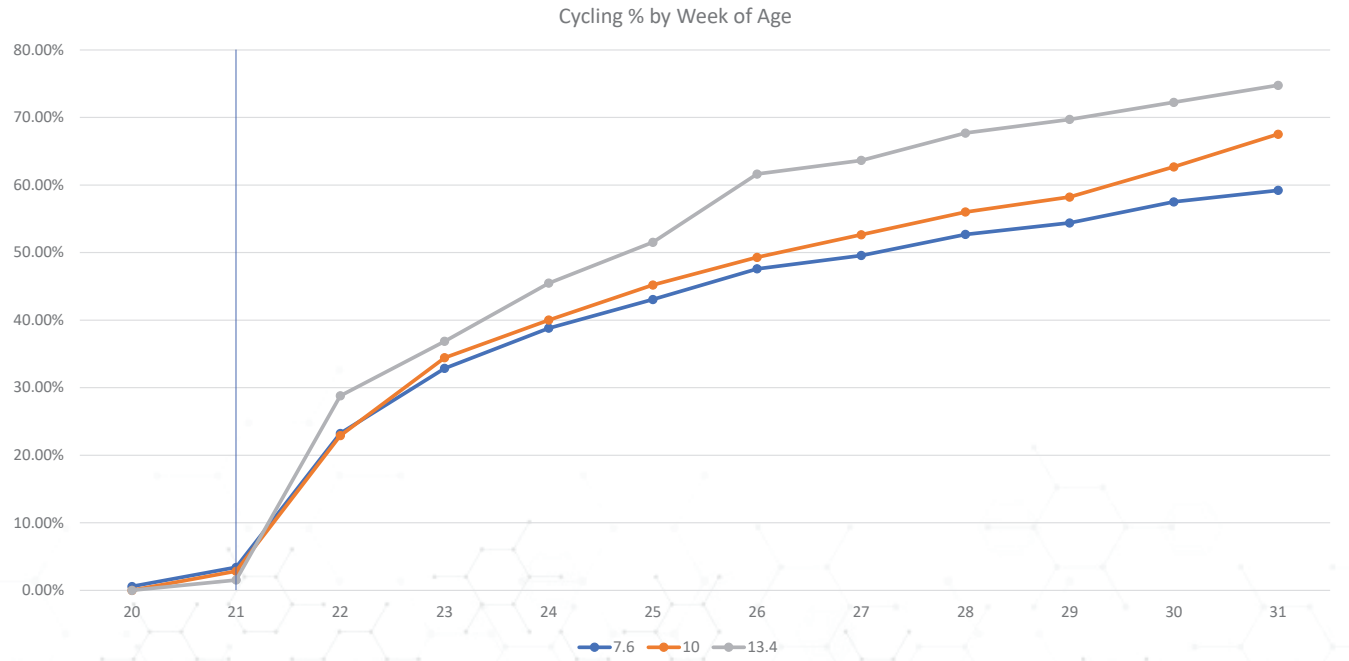
	0.71 m^2	0.93 m^2	1.25 m^2
Week 3 Weight (kg)	6.49	6.76	6.62
Week 10 Weight (kg)	28.71	28.21	28.26
Week 24 Weight (kg)	119.75^{a}	122.92^{b}	125.65^{c}
Week 31 Weight (kg)	142.88^{a}	151.95^{b}	156.49^{c}
First Cycle Weight (kg)	114.76^{a}	116.57^{ab}	124.28^{b}
First Mating Weight (kg)	140.61^{a}	146.06^{b}	149.23^{b}

*Superscripts denote significant differences between treatments at $p < 0.05$
**These weight averages are from the LSMEANS
***Only includes gilts that cycled by 31 weeks of age

Results – Raw means by milestone

Treatment	Count of Pigs/Pen	Percentage Cycled	Avg. First Cycle Age	Avg. First Cycle Weight	Percentage Bred	Avg. First Breed Age	Avg. Breed Weight
7.6	360	56.1%	168	251.8	30.0%	194	310.3
10	272	59.9%	172	259.5	38.2%	191	322.8
13.4	199	71.4%	170	273.0	45.2%	191	328.1

Data up to 30 weeks of age

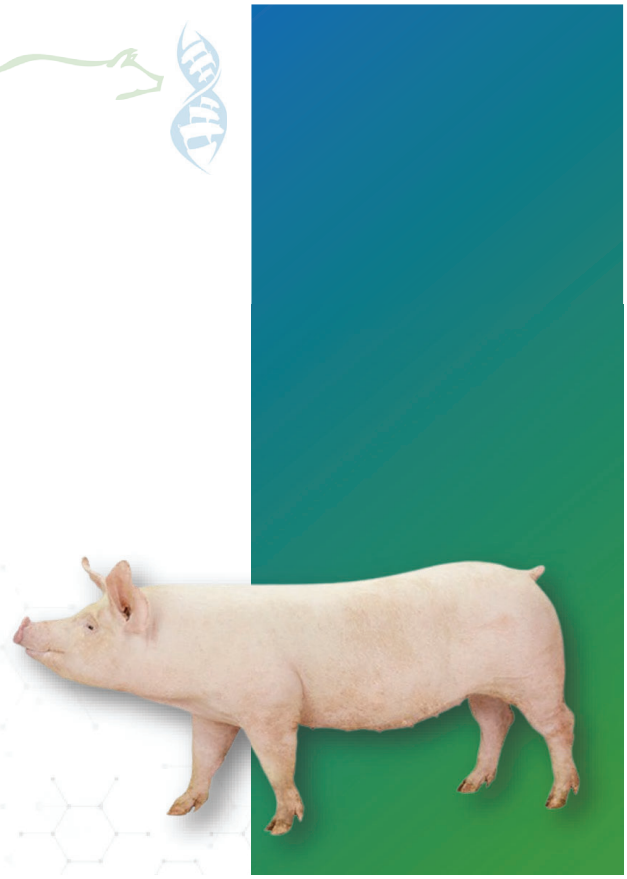


% Cycled by Treatment – Progesterone ASSAYs

Treatment (sq. ft)	% Cycled by Week 24	% Cycled by Week 26	% Cycled by Week 28	% Cycled by Week 30
7.6	28.21%	49.00%	64.01%	74.53%
10	28.36%	52.06%	71.37%	81.10%
13.4	24.75%	50.77%	73.30%	84.27%
Grand Total	27.42%	50.43%	68.69%	79.07%

Accuracy of Heat Checking by Stocking Density

Treatment (sq. ft)	% Accuracy Week 24	% Accuracy Week 26	% Accuracy Week 28
7.6	83.24%	78.29%	75.72%
10	86.19%	79.85%	74.44%
13.4	84.85%	81.03%	82.29%



Results – Structure and lesion Scoring

- Structure scoring
  - Done by 2 evaluators at On-test and 24 weeks of age
  - NO DIFFERENCE observed

- Lesion scoring

	7.6	10	13.4	P-value
Week 31 Lesion Score	1.38[a]	1.34[a]	1.27[b]	< 0.0001

*Superscripts denote significant differences between treatments at p < 0.05
**These weight averages are from the LSMEANS

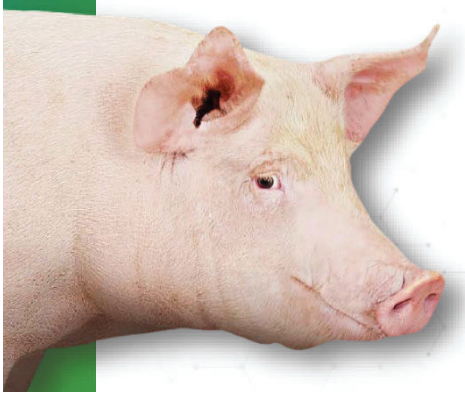
1 - No scaring, skin lesions
2 - <3 superficial lesions that do not go below the skin
3 - >3 superficial lesions or 1+ deep lesions below skin

Additional observations – wean weight effect on WTF mortality

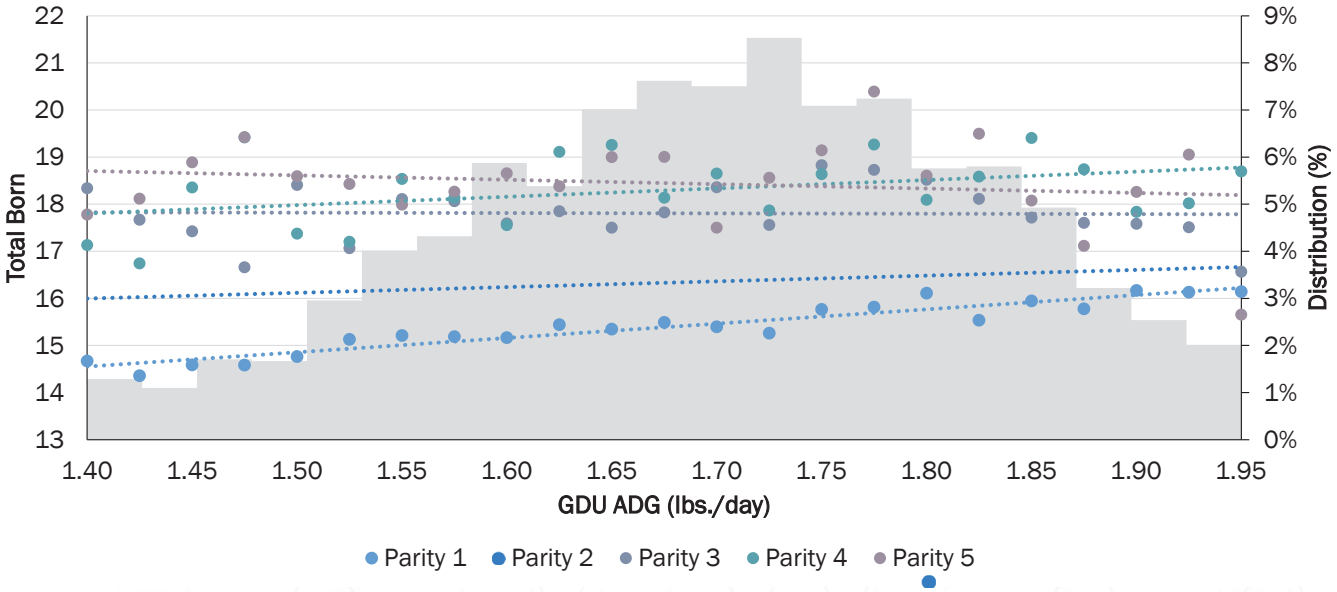
Weight Category	11 Wk Weight	24 Wk Weight	% Mortality
8-10	44.5	237.3	12.5%
10.1-12	50.1	251.3	19.2%
12.1-14	56.2	259.8	11.1%
14.1-16	65.3	274.4	10.0%
16.1-18	72.0	283.6	6.0%
18.1-20	79.7	291.3	9.0%
20.1+	87.2	303.8	7.0%

Trial Key take homes

- Stocking density affects gilt growth rate
- Stocking density affects accuracy of heat checking
- Stocking density affects gilt estrus activity



Effect of GDU ADG vs Lifetime Total Born



*Data was collected on 2,638 sows from June 2018-February 2023 at United Animal Health Research Farms.

Gilt development evaluation - growth

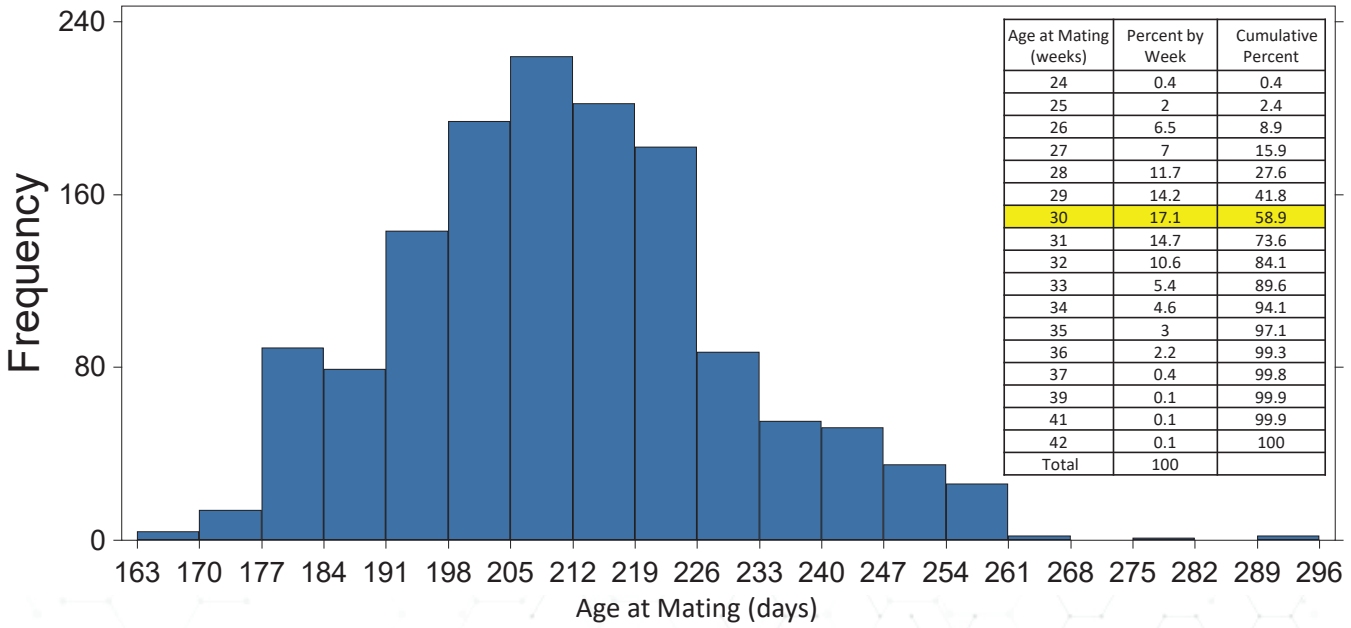
- Mature Gilt Average Daily Gain – pen setting
  - 1.4 to 1.6 lbs/day
  - 9.8 to 11.2 lbs/week

Gilt Growth Curves		
Age (weeks)	Study 1 Weight (lbs)	Study 2 Weight (lbs)
23	251	260
24	262	269
25	273	279
26	285	289
27	296	298
28	308	308
29	319	317
30	330	327

Gilt development evaluation - hns

HNS by Weeks of Age		
Age (weeks)	% of animals with HNS	% of animals with HNS (cumulative)
23	0.65%	0.65%
24	2.24%	2.90%
25	9.70%	12.60%
26	12.82%	25.42%
27	12.89%	38.31%
28	8.62%	46.92%
29	3.11%	50.04%
30	0.72%	50.76%
31	0.58%	51.34%
32	0.14%	51.48%
Total	51.48%*	

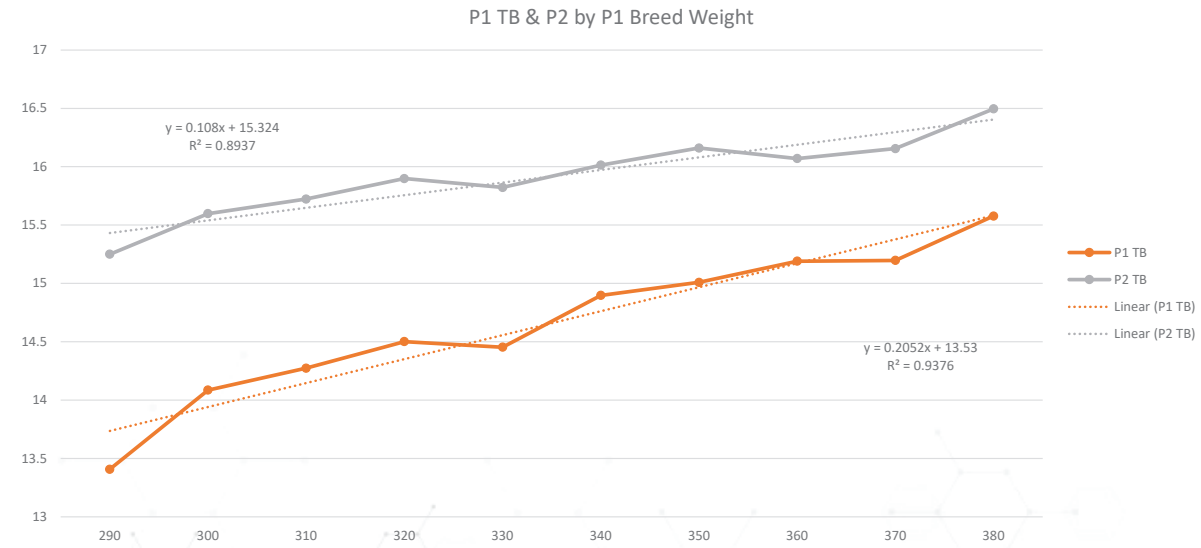
Gilt development evaluation - mating



Age at Mating (weeks)	Percent by Week	Cumulative Percent
24	0.4	0.4
25	2	2.4
26	6.5	8.9
27	7	15.9
28	11.7	27.6
29	14.2	41.8
30	17.1	58.9
31	14.7	73.6
32	10.6	84.1
33	5.4	89.6
34	4.6	94.1
35	3	97.1
36	2.2	99.3
37	0.4	99.8
39	0.1	99.9
41	0.1	99.9
42	0.1	100
Total	100	

Gilt data – pff averages

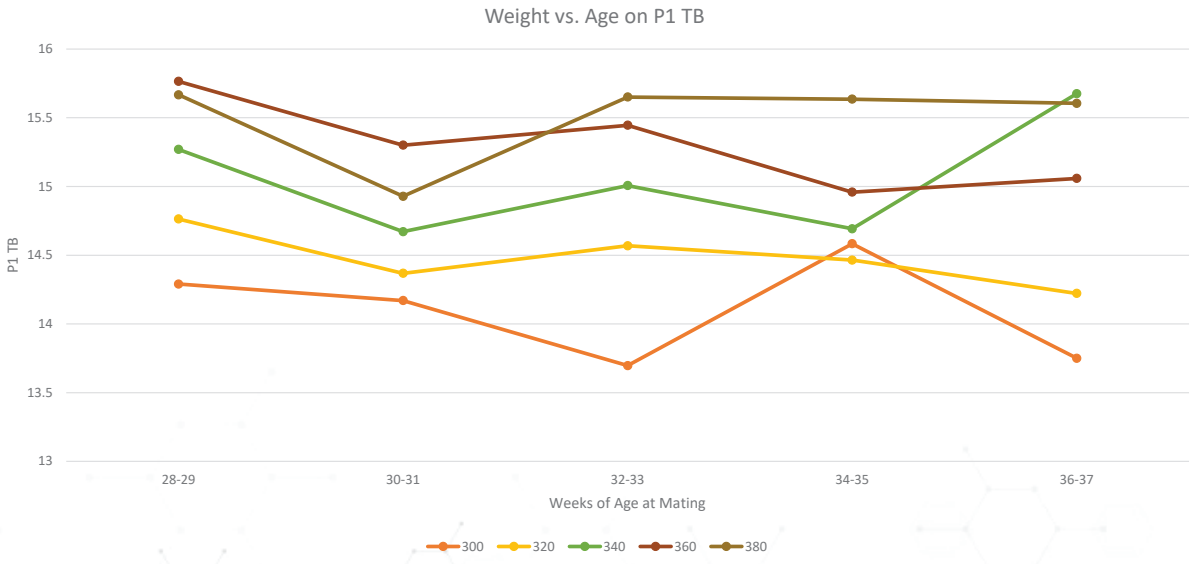
Variable	N	Mean	SD
Age at Entry/Weight (days)[wks]	1381	188.58 [27]	11.174
Age at HNS (days) [wks]	711	186.36 [26.6]	10.448
Age at Mating (days) [wks]	1381	210.83 [30]	18.265
Entry Weight (lbs)	1381	296.71	24.524
Estimated Weight at Mating (lbs)	1391	325.05	34.96



10 lbs.=
0.2 TB P1
0.1 TB P2

Dataset of 8,000 gilt litters at 5,600 head sow farm

Takeaway: The heavier a gilt is the higher her P1 and P2 TB.



Dataset of 8,000 gilt at 5,600 head sow farm

Takeaway: Regardless of age, weight is the driving factor of P1 TB

Gilt Data – Value of HNS

HNS/Cycles	P1 TB	P2 TB	P3 TB
0	14.4	15.7	16.6
1	15.0	16.2	17.0
2	15.1	15.9	

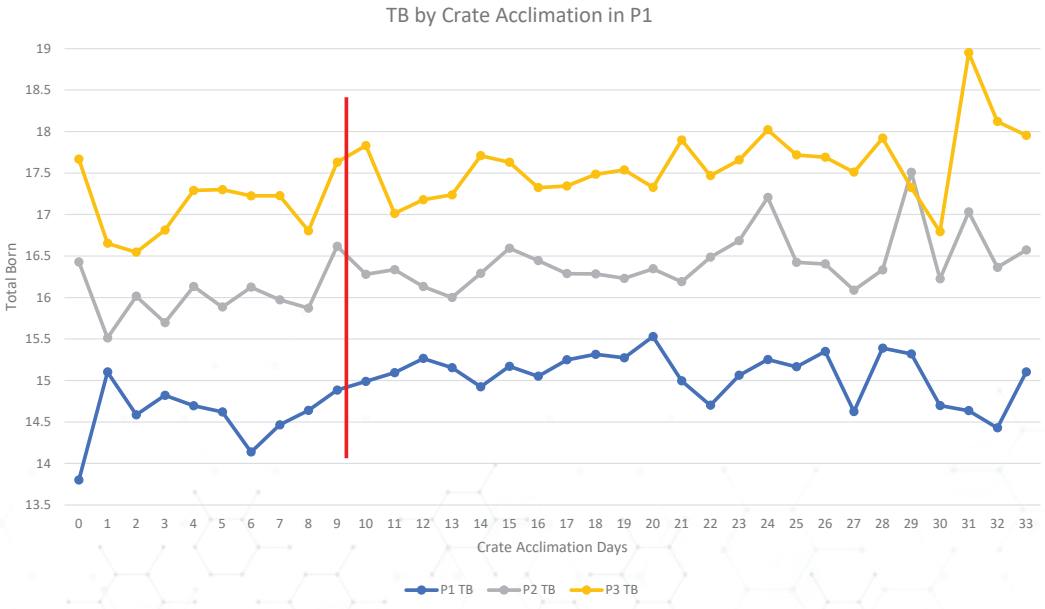
Parity 1 Performance by Breed Weight

Breed Weight	0 HNS	1 HNS	Difference
280	14.7	15.8	1.1
300	14.1	15.0	0.9
320	14.4	14.8	0.4
340+	15.1	15.4	0.3

1 HNS prior to mating = 0.5 to 1 pig TB advantage
No value to 2 HNS

5400 hd sow farm, 2 years of data

Gilt Data – crate acclimation



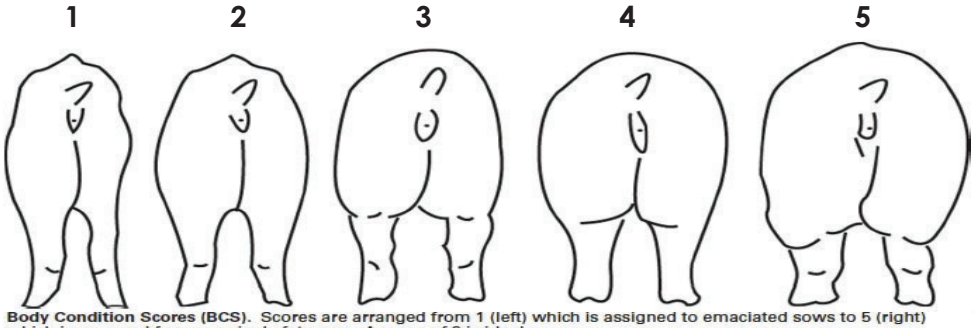
Acclimation	P1 TB	P2 TB	P3 TB
<10 Days	14.5	16	17.1
≥10 Days	15.1	16.5	17.6

5400 hd sow farm, 2 years of data

Crate acclimation = 0.5 pig TB advantage - lifelong

Gilts bred, now what?

Sow body condition scoRe



Body Condition Scores (BCS). Scores are arranged from 1 (left) which is assigned to emaciated sows to 5 (right) which is reserved for excessively fat sows. A score of 3 is ideal.
Taken from "Assessing Sow Body Condition" by R.D. Conffey, G.R. Parker, and K.M. Laurent (ASC-158); 1999).

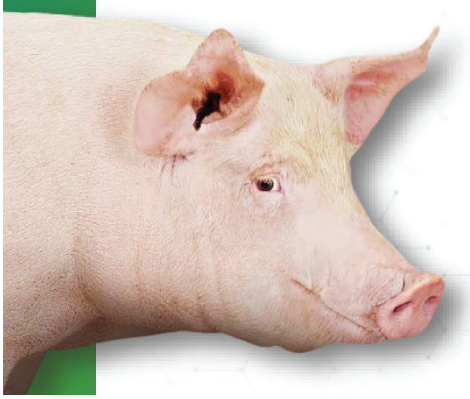
Sow body condition score

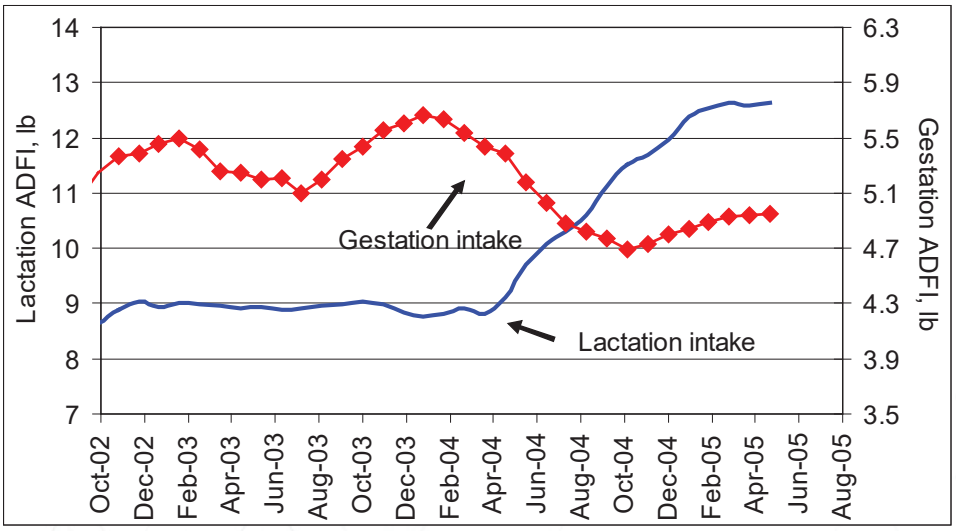
- BCS Target: 80% of herd is between 2.5 to 3.5
- Tips to hit BCS target:
  - One person needs to own
  - Ideal time at d 30, 60, and 90
  - Update feeding rate if major diet change
  - Weigh feed boxes once a quarter
    - Need to weigh approximately 30 randomly selected boxes

Sow body condition score

- Visual, palpate ribs and spine
- Ultrasound scan
- Calipers or measuring

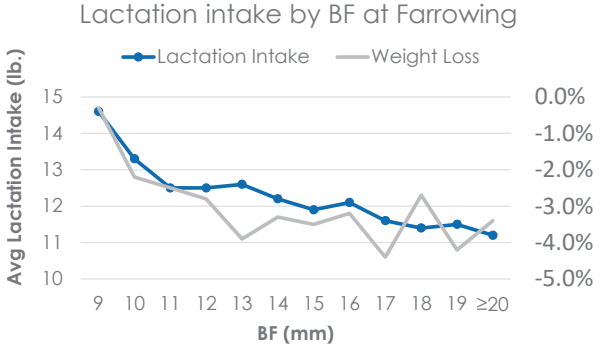
Feeding the sow

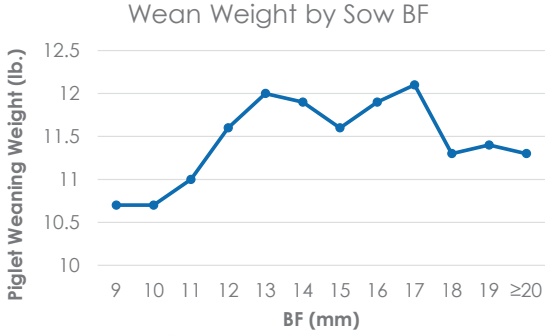




Courtesy of Mike Tokach, Kansas State University

Feeding the sow

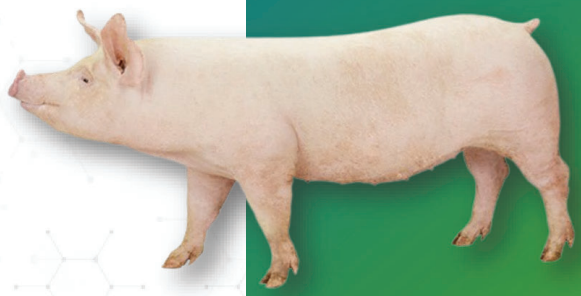




Parity	D2 Avg Weight	Lactation ADFI	Avg Weight	# Weaned
1	3.18	11.45	11.1	13.1
2	3.47	12.66	12.42	13.2
P3/P4	3.42	13.1	12.5	13

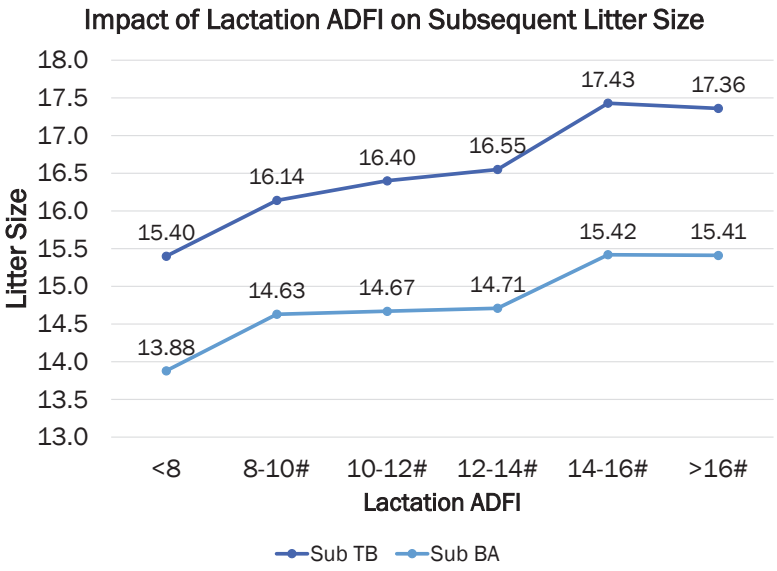
Consequence of overfeeding gestating gilt

- Unnecessary expense to the producer
  - Gestation feed accounts for approximately 65% of total sow feed intake per year
- Reduces subsequent feed intake in lactation phase
- Impairs mammary development
  - Hurts litter performance
  - Reduce reproductive performance
- Any amount that is overfed will lead to sow body weight gain and bigger sows with higher feed requirements for maintenance
- Estimated that fat sows cost $50/sow/year
  - More feed, Lower productivity

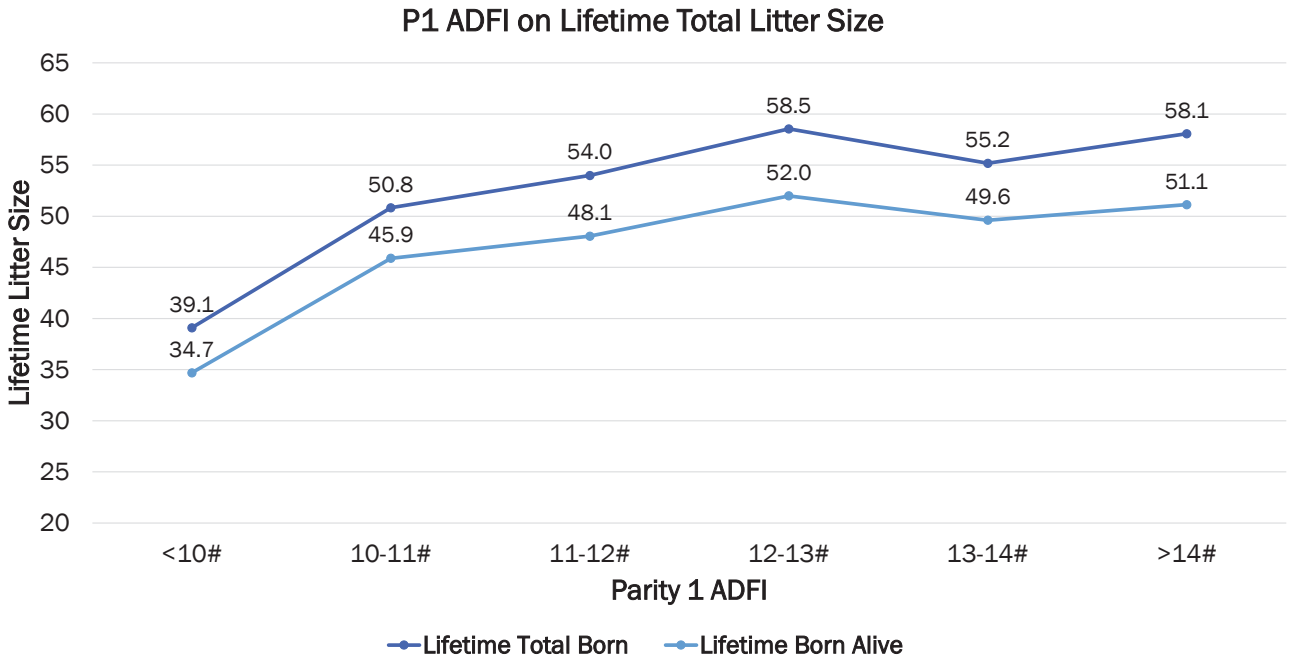


Higher lactation feed intake:

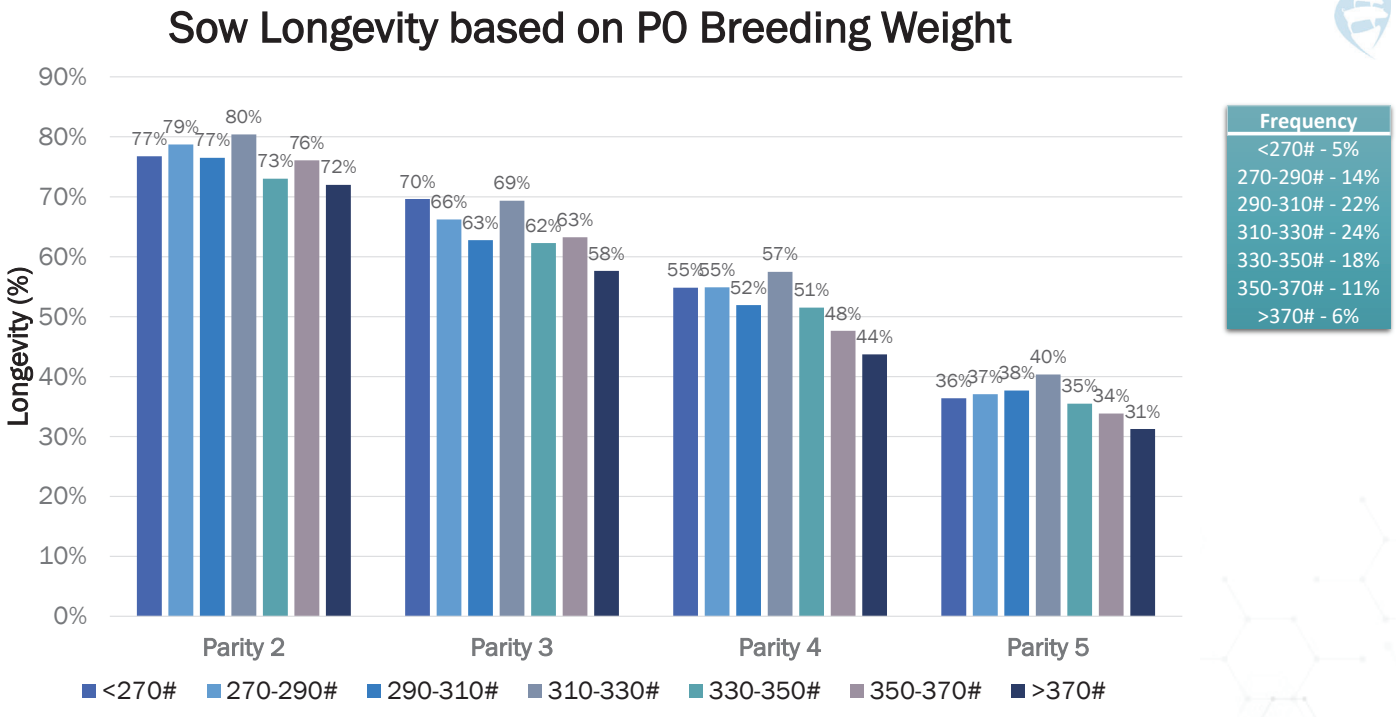
- Improves WTFSI
- Improves subsequent reproductive performance



*Data collected from 1,485 litters at United Animal Health Research Farms in June 2018-October 2019; Parity 1-3 sows

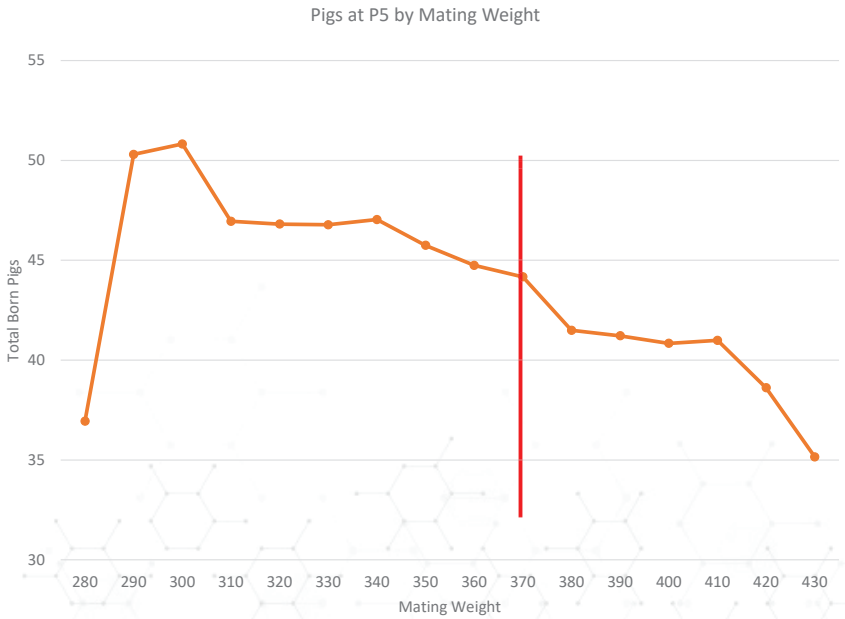


*Data was collected on 1,499 sows from June 2018-February 2023 at United Animal Health Research Farms.



*Data was collected on 2,739 sows from June 2018-February 2023 at United Animal Health Research Farms.

Gilt Data – Longevity



Age	% to P2*
28-29	78.7
30-31	80.0
32-33	82.1
34-35	75.5
36-37	72.2
38-39	71.0

*Percentage that farrow 1 litter, that farrow a 2nd litter.

5400 hd sow farm, 2 years of data

Overall gilt development strategy

- Impact on livability and reproductive performance starts EARLY
- Dedicated care to gilts (off-site development)
  - AIAO
- Square footage allotment to not restrict growth and reproduction
- Strategies for gilt development impact ability to get gilt in the herd in the first place
  - Better growth = better cycling
  - Earlier estrus detection = increased chance of crate acclimation and a skip
  - Crate acclimation and a skip = better lifetime performance
  - Better lifetime performance = increased longevity
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questions?