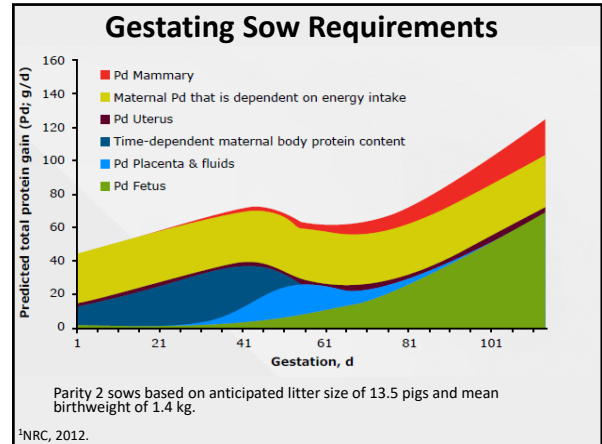




## Group Sow Housing: Capturing Potential Through Nutrition


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### Disclaimer


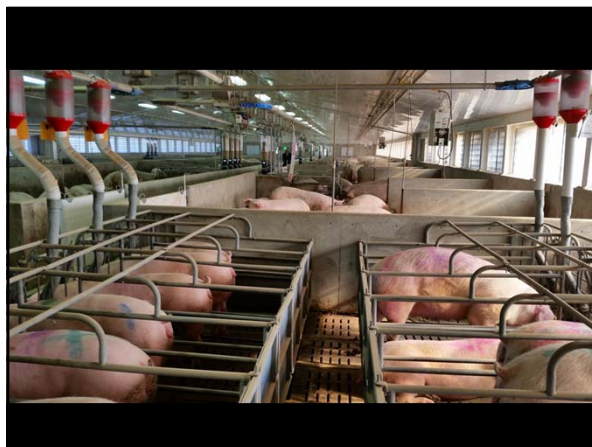
- Currently serve as the nutritionist and US Business Director for JYGA Technologies (GESTAL feeding systems).
- Much of the information presented herein is based on my own on-farm experience, but is supported by peer-reviewed literature wherever possible.

*“Properly implemented and managed, many group-housing strategies can yield similar productivity and welfare compared to gestation stalls”*



### Energy and Feed Requirements



- 1. Maintenance**
  - Most variable
- 2. Target Maternal BW Gain**
  - ~35 kg for P1, ↓ by parity
- 3. Fetal development**
  - Many simulation models have been developed and applied with good success
  - Recent alterations mainly due to changes in genotype (higher lean, less fat)

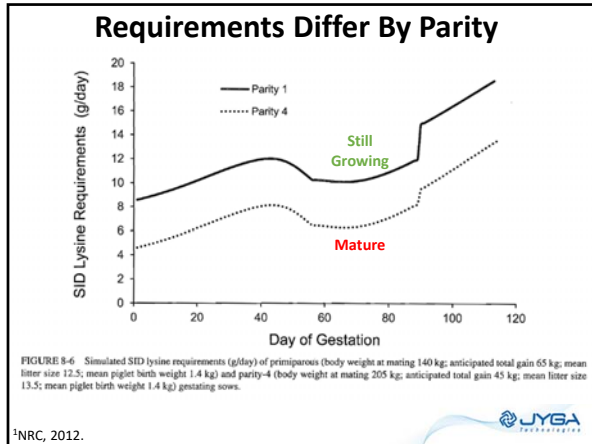



*Feeding gestating sows isn't rocket science, yet there isn't always a simple recipe!*

**Adjust Amounts Based on:**

- Environmental Temperature
- Housing System
  - Activity in Stalls vs. Pens
  - How far to travel to eat/drink?
- Sow Size
- Health Status



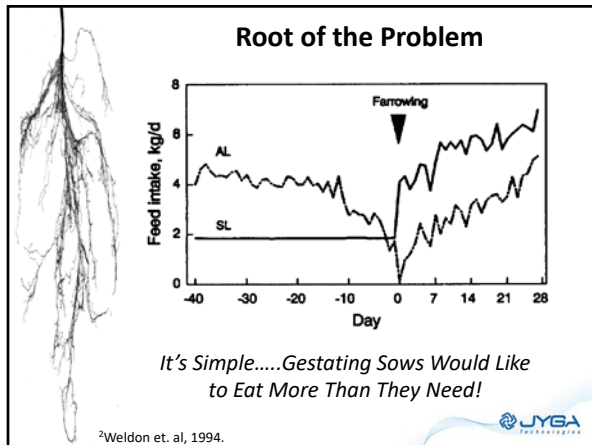
### Consequences of Aggression

Commonly Referenced Pen Disadvantages

- Mortality
- Removals (Lame/Aborts)
- Off-Feed Events
  - Competitive vs. Non-competitive
- BCS Variation
  - Need to overfeed the group?

*Are these consequences we just have to accept?*

We assume all sows ate      We know she didn't eat



### SMS Management Alternative Housing Study 2012

	Crates (386 farms with 726, 437 females)			Pens (133 farms with 194,114 females)			ESF (8 farms with 11,183 females)		
	Top 25%	All	Bot 25%	Top 25%	All	Bot 25%	Top 25%	All	Bot 25%
P/WN/Mf/YR	28.43	25.7	23.31	27.00	24.8	22.64	30.36	25.59	22.00
Wean Service	6.05	6.68	7.36	5.89	6.21	6.66	5.66	6.65	6.25
Farrow Rate %	90.20	87.0	84.10	87.60	86.0	84.40	93.70	84.50	77.10
Fe Death %	6.20	7.50	8.40	7.20	6.80	6.40	3.60	7.70	8.90
Ave. Parity	2.52	2.64	2.65	2.81	2.92	2.95	2.67	2.58	2.81

Data provided by Swine Management Services from Article in NHF-May 2012

*Maybe it's not as bad as we think.....but likely more variation*

### Food Motivated Aggression

- Competitive feeding
  - Floor Feeding
  - Shoulder Stanchions
- Non-competitive feeding
  - Free access stalls
  - ESF's
  - Free-access ESF's


### What Happens If We Overfeed Sows?

- Over-conditioned animals are costly
  - Wasted feed
  - Decreased productivity in subsequent lactation<sup>11</sup>
- Causes
  - Overfeeding whole pen to improve BCS in thin sows
  - Failure to calibrate box drops or ESF
  - Staff do not understand BCS scoring


#### Effect of increased back fat at farrowing

<sup>3</sup>Young et al, 2004. Means without a common superscript differ  $P < 0.05$ .

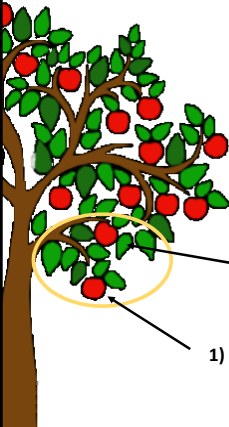
### Stockmanship



*"No matter how acceptable a system may be in principle, without competent, diligent stockmanship, the welfare of animals cannot be adequately cared for". – British Codes for the Welfare of Farm Livestock*




### Low Hanging Fruit





2) Body Condition Scoring

1) Calibration

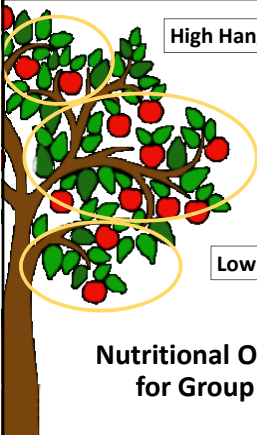


### The Transition - Staff

- For farm staff, the conversion to group housing is not a choice, but a mandate. Some workers will not have the right attitude to be successful managing loose sow housing.
- KEY:** Identify the right person to manage group-gestation!


## Ad Libitum?




**High Hanging Fruit** *Need More Research*

**Middle Fruit** *Implement Known Opportunities*



**Low Hanging Fruit** *Execution*

### Nutritional Opportunity Areas for Group Housed Sows




### Calibration


- Not always done well in individual stalls either
- Calibrate your feed system!
  - Box drops and ESF's are volumetric
  - How often does your diet change?
  - Not hard, but easy to forget

**Recommendation:** Match up calibration with other "monthly duties" in farm maintenance




### Body Condition Scoring



Condition score 1: Condition score 2: Condition score 3: Condition score 4: Condition score 5:

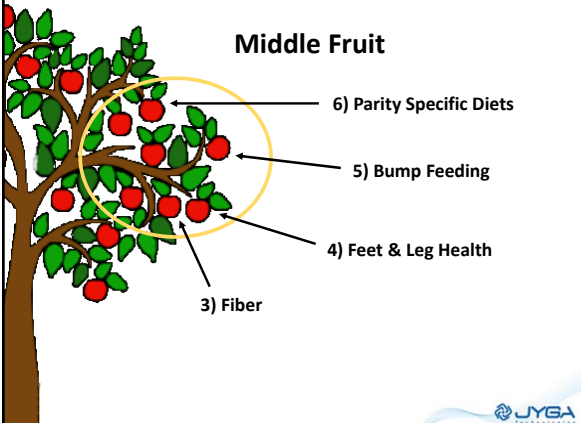
NFACC Code of Practice for the Care and Handling of Pigs, 2014

- Are the people moving sows into pens properly trained?
- While imperfect, sow caliper or flank-to-flank tape can deliver measurable results



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### Middle Fruit

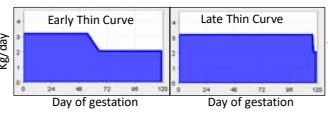



- 6) Parity Specific Diets
- 5) Bump Feeding
- 4) Feet & Leg Health
- 3) Fiber

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### Body Condition Scoring

- How often?
- Early Thin/Late Thin
  - Prevents "early thins" from becoming fat

Walk the pens too!


Many feed systems have mobile tablets!

**Recommendation: Score BCS and adjust feed level at breeding, preg check, and around d 70 of gestation**

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### Fiber Inclusion

- Can your nutritionist increase bulk density?
  - Gestating sows are the best at digesting fiber!
  - Higher fiber diets increase satiety and reduce aggression and stereotypies<sup>4</sup>
  - Often less expensive by-products (soybean hulls, wheat midds, beet pulp)
  - Fermentable fiber if possible
  - Enrichment materials




<sup>4</sup>Sapkota et al., 2016.

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### Body Condition Scoring

#### What about Removals/Hospitalized Sows?




Get her in here quickly!

- When to react to "non-eaters"
- Removals are normal but depends on feed system
  - Floor-feeding and shoulder stanchions (up to 10-15%)
  - ESF and free-access ESF (usually 3-5%)
- Don't forget to add dedicated hospital spaces to layout
  - Pens allow for faster recovery than crates
  - Place hospital places in well-traveled areas
  - Make sure they have feed/water daily

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### Challenges with Fiber




- Despite benefits, high fiber ingredients offer challenges
  - Variability in nutrient content
  - Greater risk of mycotoxin contamination
  - Reduce feed bin capacity
  - Bridging
    - Can be problematic for some ESF systems (eating 24 hr/day)

**Bin vibrator example**

**Recommendation: Regularly sample and analyze by-product feeds for nutrient and mycotoxin content. Add flow agents or bin vibrators if feed bridging is common.**

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### Feet & Leg Health



**IDEAL**                      **TOO COMMON**                      **TOO COMMON**


Change in Severity of Claw Lesions After Supplementation With Organic Zn-Mn-Cu Mineral Complex


Claw Lesion	Improvement Or No Change	Worsening
Sole	74.5%	25.5%
Heel	62.4%	37.6%
White Line	85.8%	14.2%
Wall	83.7%	16.3%
Coronary Band	92.2%	7.8%
Toe	68.1%	31.9%
Dew Claw	66.0%	34.0%

<sup>5</sup>Lisgara et al., 2016. 

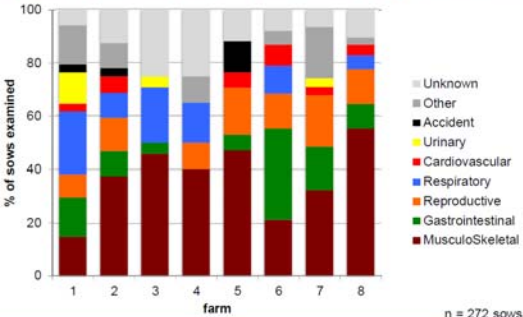
### Bump Feeding

- Traditionally practiced by adding 0.5-1.0 kg/d from 90 to 110 d
  - Earlier data indicated benefit to piglet birth weight
  - Argument: prevents the sow from becoming “catabolic”,
- Current area of debate in swine nutrition community
  - Genotype may play a role in the response to the “bump”
- Recent data indicates limited benefit to BW and most of “feed bump” deposited as maternal tissue.
  - May also increase stillborn rate in sows<sup>6</sup>
  - Likely to reduce lactation intake if sow becomes overconditioned<sup>7</sup>
  - Unnecessary extra feed expense?


 **Recommendation: If bump feeding, consult your nutritionist to determine if it remains necessary.**

<sup>6</sup>Goncalves et al., 2016. <sup>7</sup>Close and Cole, 2000. 

### Diagnosed causes of sow death by sow farm




n = 272 sows

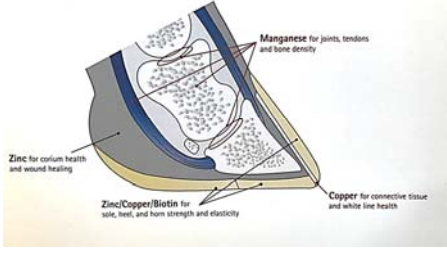
Torrison, 2017. DSM Pork Nexus  **Driven to Discover™**

### Parity Specific Diets


- Uncommon in stall barns due to limits of single feed line
  - Can only adjust feed allowance
  - Gestation diets usually formulated to gilt requirements
- However, it is well known that young sows (P1 & 2) have higher AA, Ca, and P requirements.<sup>1</sup>
- Retrofits or new construction to group-housing allows for re-think of feed presentation.
  - Opportunity to save \$\$\$ on older sows?
  - Pen aggression and removals lower when younger and older sows housed separately<sup>8</sup>
- Still need to consider the additional management and feed equipment that may be needed.

<sup>1</sup>NRC, 2012. <sup>8</sup>Strawford et al., 2008. 

### Feet & Leg Health



**Recommendation: Additional of organic trace minerals to group-housed sows may offer benefit**



### Parity Specific Feeding Example

**A**

60	60	60	60	60
60	60	60	60	60
60	60	60	60	60
60	60	60	60	60
60	60	60	60	60

80 feed stations total

20 60-hd pens, mixed parity  
15 sows/station

---


**B**

60	60	60	60	60
60	60	60	60	60
60	60	60	60	60
60	60	60	60	60
60	60	60	60	60

70 feed stations total

10 60-hd P2+ sow pens  
20 sows/station

10 60-hd P1/P2 pens  
15 sows/station



### Parity Specific Diets - Example

**Assumptions:**


- P1 and P2 sows grouped together (~50% of herd)
- 0.56% SID Lys fed to "young sows", avg 2.1 kg/hd/d
- 0.40% SID Lys fed to "old sows", avg 2.2 kg/hd/d
- No adjustment to Ca or P levels
- Sept 2017 prices for corn (CAN \$4.17) and SBM (CAN \$393/ton), no fiber by-products
- 21-d lactation, mixing into pens at d 42
- 2,500 sow herd (~120 farrowed per week)

<b>Projected Feed Cost Savings:</b>	<b>Savings/sow/yr</b>	<b>Annual herd savings</b>
	CAN \$3.08	CAN \$ 7,690

<b>Additional Equipment needs:</b>	<b>Item</b>	<b>Cost</b>
	Two - 19 ton feed bins	CAN \$ 11,000
	Feed Drive Unit	CAN \$ 3,600


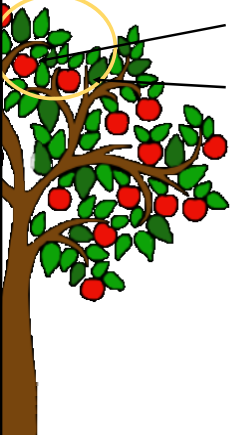
**2 year payback**



### Short Term Feed Additives

- Feed additives to reduce mixing aggression
  - Odor masking agents
  - Additives used to treat aggression in humans<sup>9</sup>
- Omega 3's in early gestation
  - 6 g/kg fish oil in early gestation increased NBA by 0.9 piglets in a recent Australian study<sup>10</sup>
  - Embryo survival increase was largest in older sows
- Supplemental Folate and B<sub>12</sub>
  - Fed during first 30-60 days of pregnancy may reduce early pregnancy loss<sup>10</sup>
- Betaine
  - Targeted application during heat stress events


<sup>9</sup> McGlone et al., 1980. <sup>10</sup> Australian Pork CRC Group Housing Update.

8) Short-Term Feed Additives


7) Precision Feeding

**High Hanging Fruit**




### Bottom Line

1. Properly managed, various group housing systems can yield equivalent production to gestation stalls.
2. While gestation sow requirements in individual stalls are well-understood, execution is often a limiting step.
3. Conversion to group-housing does involve management challenges, but also opportunities to re-think emphasis on stockmanship and implement protocols that optimize sow performance.
4. Some new opportunities exist to reduce feed cost, minimize aggression, and increase performance through the use of new technologies. Consult your nutritionist to discuss these options.

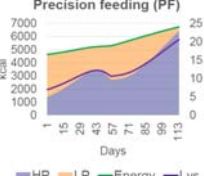


### Precision Feeding in Gestation



- Feeding systems now have the ability to alter the diet on a daily basis to match sow requirements
  - Sow AA needs highest in late gestation
  - Existing research needs to be repeated on a larger scale
  - What about the ROI? Feed blending systems add additional cost



**Precision feeding (PF)**



**Recommendation: More large-scale research data needed before investing in this technology at the commercial level**

**QUESTIONS ?**