2010

Swine Profitability Conference

Sponsored by
Department of Animal Sciences and Industry
K-State Research and Extension
Kansas State University, Manhattan

SWINE PROFITABILITY CONFERENCE

Sponsored by

Department of Animal Sciences and Industry and
K-State Research and Extension Service of
KANSAS STATE UNIVERSITY

Co-sponsored by

Kansas Pork Association
College of Veterinary Medicine, KSU
ADM
Elanco Animal Health
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Lextron Animal Health
Midwest Livestock Systems
National Pork Board
Novus
Suther Feeds

Tuesday, February 2, 2010
Forum Hall, K-State Union

SWINE PROFITABILITY CONFERENCE

KSU Forum Hall
K-State Union
Tuesday, February 2, 2010

Program Agenda

Morning Program

9:15 a.m. Registration

9:30 a.m. Jack and Pat Anderson Lecture in Swine Health Management:
Right Sizing the U.S. Swine Industry – What I've Done with My Clients During These Challenging Times
Dr. Joe Connor, Carthage Veterinary Service, Carthage, IL

10:30 a.m. **Risk Management – A Producer Perspective**
Rob Brenneman, Pork Producer, Washington, IA

11:15 a.m. **What Does the Future Hold for the U.S. Swine Industry?**
Steve Meyer, Paragon Economics, Des Moines, IA

Noon **Lunch**

Afternoon Program

1:15 p.m. **Recent Breakthroughs in Lowering Cost of Production and Improving Margin Over Feed**
K-State Swine Team

2:00 p.m. **Restoring Confidence After a Stressful Period**
John Currie, Athletic Director, Kansas State University

3:00 p.m. **Adjourn**

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Table of Contents

….Notes…..Notes…..Notes…..Notes

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February 2, 2010

Jack and Pat Anderson Lecture in Swine Health Management:

"Right Sizing the U.S. Swine Industry – What I've Done with My Clients During These Challenging Times"

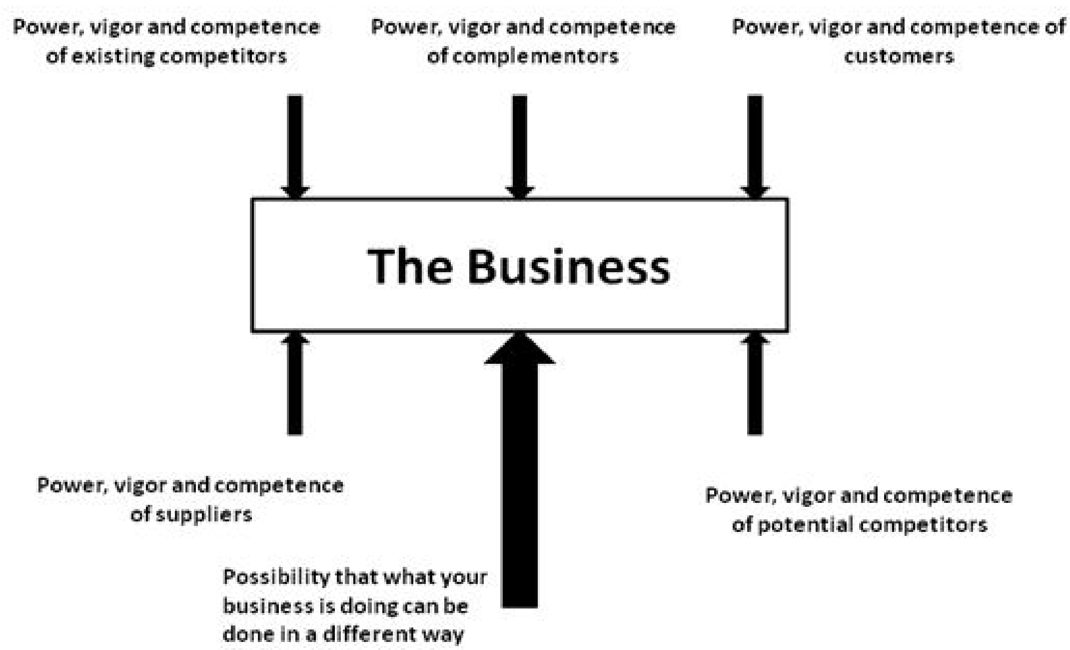
by

Dr. Joe Connor
Carthage Veterinary Service
Carthage, IL

Jack and Pat Anderson Lecture in Swine Health Management:
"Right Sizing the U.S. Swine Industry – What I've Done with My Clients During These Challenging Times"

Dr. Joe Connor, D.V.M., M.S.
Carthage Veterinary Service, Carthage, IL

In preparing for this paper, I read and suggest you read as well "Only The Paranoid Survive" by Andrew S. Grove, Chairman of the Board of Intel Corporation. He references six forces in classical competitive strategy analysis that determine how competitive a company is. These are illustrated in the following chart.



He notes that when some elements of one's business becomes a magnitude of larger than what the business is accustomed to, chaos reigns. If there is a very large change in any one of the six forces, you lose control of your destiny. He suggests that to manage a business in the face of a "10X" change is very, very difficult. The business responds differently to managerial actions than it did before and the period of transition is particularly confusing and treacherous. Grove refers to this as the inflection point, which is when the balances of the forces shift from the old structure to the new. Eventually a new equilibrium in the industry will be reached. How a business manages this transition determines its future. This is our swine business!

As the world comes to and passes 7 billion population, it is hard for us to understand how we can be in a low cost food production system and not be profitable. We face critical questions regarding the mechanism by which food production distribution involves to meet the needs of the people. Staggering rates of population growth over the next two decades promises a large increase in the demand for food. This is a positive factor for agriculture, but may be less so for meat producers. First world mission countries are considering taking individual and group policy actions with the intent to slow the future growth of their economies. These actions are being taken to conserve scarce global resources available to meet the rapidly growing future demand and to slow the advance of global warming while alternative technologies for energy, production, and consumption are developed. Studies have shown that there is nearly a perfect correlation between increased global wheat consumption and rising global per capita income, but if slow growth policies are successfully adopted in a coordinated fashion, global per capita incomes will slow as well as the demand for meat production. It is frustrating to be involved in an industry that can be a world leader with respect to cost, but yet unable to sustain growing industry on exports because of the volatility and other dynamic factors. Our industry has to be smaller to return to profitability. Our industry will continue to be challenged with the corn and soybean meal cost as we balance between stock use ratios and energy policies that pay a greater premium for fuel at the expense of food.

It is likely that meat consumption per capital will decline in the developed countries even as it is increasing in the underdeveloped countries. Several of our key trading partners will try to increase their own production and reduce reliance on imports. Animal protein prices eventually reflect higher feed cost, increasing animal welfare regulations, increasing environmental issues, global warming, lack of human capital, and continual pressure to manage the increasing human waste line. In an industry that has excess production and processing capacity there will need to be difficult decisions. Downsizing the industry is a combat among existing farms. It is extremely difficult to accept that an industry that has the land base for the major inputs of grain and soybeans and the land base to utilize the waste nutrients must constrict in order to return to profitability.

Producers in this conference are in the high productivity group – but as we have learned during the past three years high productivity will not return us to profitability. We are all aware that the fundamental forces of the last three years involve a combination of several factors; 1) a fundamental shift in the corn/hog price balances, 2) the world economic recession, 3) the novel H1N1, 4) huge reliance of exports, 5) improving breed-to-wean and wean-to-finish productivity, and 6) failure of expansion restrain.

Swine operations in the 70s and 80s were land based. Since 1990, the industry has been driven by the ability to add value into the chain by employing new technology in production that lowers cost. Returns were good and because of inefficiencies in sow and wean-to-finish productivity massive capitalization occurred. Swine enterprises were driven by economy of scale of facilities and flow. Our industry has experienced a tremendous year on year improvement in pigs weaned per inventory sow and carcass harvested per inventory sow. Producers increased facility size to manage construction cost and increased sow populations to increase the number of pigs produced per week to capture the flow advantages of rapid wean-to-finish fill time, which has directly lowered cost by improving record capture, diet budgeting, diet transportation cost, harvest transportation cost, and health. We lowered wean-to-finish costs by finishing pigs in the grain dense areas and decreasing harvest transportation cost by locating pigs in the slaughter plant dense areas, but in many cases compromised health.

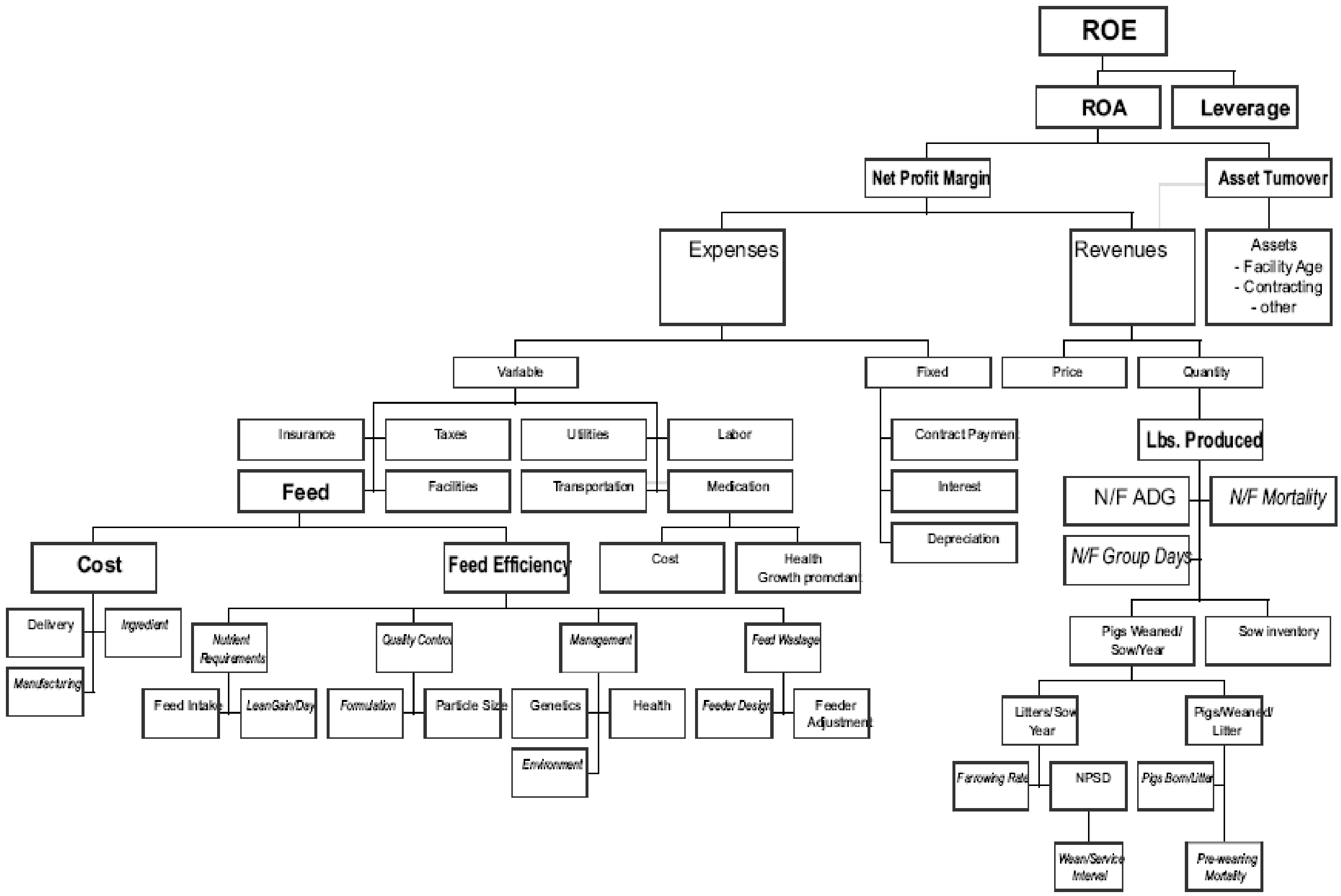
Because returns were greater in a swine operation, this enterprise grew much more rapidly than land ownership changing the traditional land equity to swine facility or operating equity. To compete producers grew and/or aligned in breed-to-wean and/or wean-to-finish systems. This shifts some of the assets from a central farm and gives up some day to day control, but usually advantages outweigh disadvantages. The new technology that was incorporated in the early 1990s, the scale of economies and coordination has largely been gained and captured by remaining producers. There will be additional gains from genetics both in sow productivity and wean-to-finish feed per gain, average daily gain. However, these gains will continue to improve efficiencies and lower cost, but the gains will be incremental. The huge financial values that we realized by industrializing the pork sector have been captured and the question is, what is the model that will sustain us into the future?

What do you do when all of the available models that you can foresee are not satisfactory to return us to profitability? It is extremely frustrating that we have not achieved a model that would balance the risk from the various stake holders within the industry. There remains lack of transparency even in a coordinated system and there remains lack of good faith negotiations and understanding on how to balance the risk with each of these stakeholders. The business model for success has both a short and long term component. In the short term, you must work for survival at the same time as we are evaluating our financial capacity and desire to remain in the business. We must continue to use new technology and particularly focus on technology that lowers cost and improves efficiencies. We have to implement daily all the technology that we have. Benchmarking data still illustrates a wide difference in productivity and cost of production highly driven by people and health. Survival will include sales of existing facilities, which will make those facilities and systems more cost competitive, and thus further challenge existing that must think every day about risk management. However, production systems are very inflexible due to the immense capital requirements and the biological lag in the production cycle. Pork production will be characterized by dramatically increased financial risk especially among nations that export pork.

Producers have to correctly analyze the condition of their present enterprises and that they should look within themselves and say, “Is this a business that I want to compete? Can I tolerate the day to day volatility and decision making?” We only have to look around this room and see the toll that it is taking. If you decide to remain within this industry you must continue to drive toward cost effective improvements. We are all under the same competitive pressures. This will mean increasing alliances and partnerships as a method to manage the risk. It will mean greater transparency of cost and much higher scrutiny from a number of outside sources. The new values will come from product differentiation and access to growing markets.

The current system must evolve to one which is capable of sufficient average profits while lowering the profitability variance. Producers must measure, understand, and control the variance of production costs and revenue. Without tracking variance, farms are missing large opportunities to increase the value of their final output, reduce its costs, and stabilizes future outcome. Disease remains a number one cause of variation in production, and thus profitability. Predictability of prevalence, and thus disease outcomes and interventions will be necessary.

It is useful to use the DuPont equation to evaluate your current business and to direct strategy. The DuPont equation breaks ROE into three parts which are asset management, expense management, and debt management.



Using this model one can use the ROE to link financial, biological, and market risk as a predictive tool. The intuitive strength of the ROE tree is that each of three major drivers can be expanded to understand factors affecting ROE and one can quantify the impact of various levels of variation. The goal is to maximize ROA by effectively managing and balancing profit margin and asset turnover. To improve ROA, farm needs to improve margin, turnover, or both. Margin can be improved by cutting cost both variable and fixed and increase in per unit sale price, i.e. quality, quantity premium, and futures. Turnover can be increased by increase in sales volume, disposing of needed inventory, disposing of unused fixed assets, speeding up of collection receivables, and maximizing credit terms. In swine, the commodity risk tends to dictate. Financial leverage needs to be low to keep the risk to the lender satisfactory without causing the lender to require a premium. If a producer implements proper risk management, the risk to the lender is reduced and the lender can allow higher leverage.

Managing all three of these areas well tends to maximize the value of the business. What happens when one or more of the components could not be controlled? Historically, most common eliminating factor is under employment of existing resources. Assets already purchased are often ineffectively used to generate sales. Asset turnover for a well run farrow-to-finish owned farm will be 0.8 – 0.9 range. Variables to review include sow herd mortality, non-productive sow days, preweaning mortality, wean-to-finish mortality, average daily gain, pigs weaned per litter, harvest weight, farrowing rate, and parity distribution.

The second component of the DuPont equation is net profit margin. The key for most farms in this component is expense control. Good long term average net profit margins as defined in the DuPont equation for owned farrow-to-finish operations are 69 percent. The key subcomponents are feed expense per unit of gain, feed conversion, labor, interest, utilities, and appreciation. On the income side, market price, percent lean, percent full value pigs in the optimum category are key determinants of net profit and components of feed cost per ton, feed efficiency, and average daily gain.

Take the DuPont ROE model and work through each variable. Note that there are still tremendous opportunities to improve costs and revenues and that on both the expense and revenue side health is a major driver. Drive your business on implementing a high percentage of the basics day after day, week after week. These are areas that come to mind:

- Expenses
  - Variable
    - Health Costs
      - Medications –
        1. Continually review your health program and strategies. These are unique to your herd or system. We are embarking on continuous diagnostic profiling that will more effectively manage each group of pigs. It will take a very close working relationship with your veterinarian, but the rewards will be huge.
        2. Genetics – work to understand the genetics X health interactions to determine sire and dam lines.

Net Profit Margin	
Items	**Actions**
Revenue	
Price	Manage risk
Quantity	Health • ADG • Wean weight • Wean age
	Pigs weaned/sow • LSY • Lactation length

Expenses	
Feed	
Costs	Alternate ingredients
	Maximize manufacturing • Pelleting • Delivery
Feed Efficiency	
Quality Control	Formulation
	Particle size
ADFI	Health
	Nutrient balance
Management	Feed adjustment
	Environment
	Individual pig care
	Animal density
Health	Pathogen management
	Vaccine compliance
	Individual pig care
	Therapeutic compliance
	Environment
Fixed	
Contract payment	Competitive
Interest	Refinance

In summary, our industry has had an inflection point. Thoroughly review your business and use the DuPont model as a template to evaluate opportunities. Many of you are in the most sustainable business model because you are land based, excellent producers that are aligning in both the input and revenue side of the model. The industry will not be easy. It will require more alignment and more decisions, but those of you that develop your staff on the basic components of production will be sustainable.

References

DiPietre, Dennis; Fuchs, Lee; Tubbs, Rick. "Using the DuPont Model." *1997 Allen D. Leman Swine Conference*.

Fuchs, Lee; Reeves, David; Morrison, Bob. "Using the return on equity (ROE) tree to help manage a business." *1999 Allen D. Leman Swine Conference: Track II - Production*.

Grove, Andrew S. "Only The Paranoid Survive." Doubleday Business 1996.

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February 2, 2010

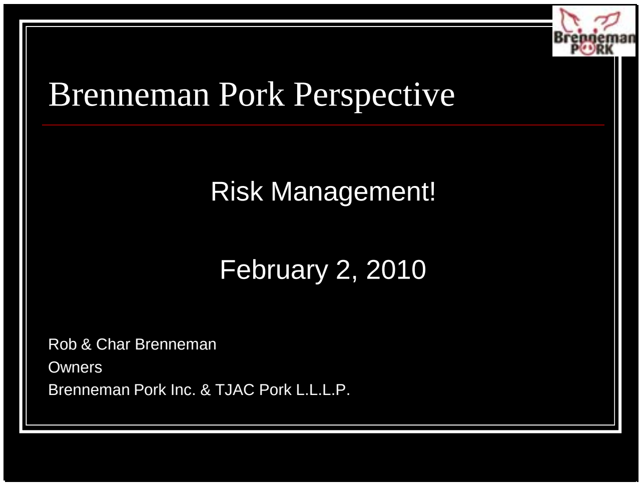
"Risk Management – A Producer Perspective"

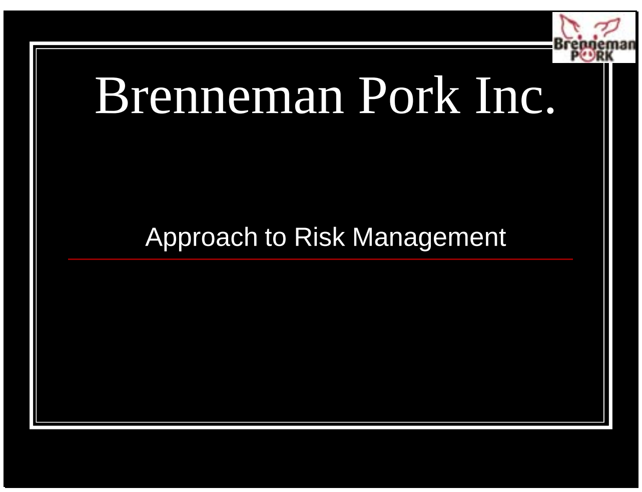
by

Rob Brenneman
Pork Producer
Washington, IA

Risk Management – A Producer Perspective

Rob Brenneman
Pork Producer, Washington, IA





Breakdown of Risk…..

1. Market- No control
2. Health- Some control
3. People – Total control

Marketing Breakdown

- Lean Hogs
- Corn
- Soybean Meal
- Basis- Hogs, Corn, SBM

Do What, When, How, with Who?

So many options!!!

- Long Puts
- Short Puts
- Long Calls
- Short Calls
- Short Futures
- Long Futures
- Packer Contracts
- Collars
- Spreads
- Actual Basis
- Fixed Basis

Lenders

- ***Caution-*** Lenders are on board until capital get tight
  - Can limit the tools available

BPI's Risk Management

- Hog Options & Futures
  - Purchased hog puts $2-3 under market
  - Sold hog calls $10-12 over market
  - Exchanged options for CME with packer as market rallied

Input Risk Management

- Corn
  - Purchased call options 10-20 cents over market
  - Sold calls $1 over long call
  - Sold puts $1 under long call
  - Total cost $0!

Allow market participation up $1 in raising market
Allows physical purchase in falling market to $1 down before margin required

Soybean Meal

- Hog Options in place
- Corn Options in place
- SBM- Priced physical based on margin calculator
  - Purchased Put options to protect from falling prices

Margin Calculator

Profit Margin

INPUT DATA		**EXPENSE /PIG**		**INCOME / PIG**	
Date Purchased	July 13, 2009	Purchase	$37.00	Lean price	$138.60
Number of pigs purchased	2400	Feed	$72.80	Grade add	$11.17
Pig price	$37.00	Pig space	$17.72	**Gross revenue**	**$149.77**
Pig weight in	14	death & cull	$4.87		
Pig weight out	280	Interest expense	$1.74	**Net return /Pig**	
Average daly gain	1.61	Other variable	$6.29	profit / pig	**$9.35**
Feed conversion	2.40	**Total Expense/Pig**	**$140.43**	profit / group	$21,575.76
		Cost /cwt live	$50.15	annual return to facility	$46,265.26
Corn price$/bushel	**$4.00**	Cost /cwt lean	$65.99	return on investment	6.40%
Bean meal $/ton	**$290.00**				
DDGS $/ton	**$115.00**				
Fat $ / ton	**$550.00**	**Feed Data**		**Pig Group Data**	
Premix $/ton complete feed	$30.00	Ingredients		Number of pigs / fill	2400
Feed drug $/ton	$4.80	% Corn / ton	59.6%	Number of pigs death & cull	91.68
Grind mix & deliver/ton	$12.00	% SBM / ton	19.7%	Number of pigs marketed	2308.32
Fixed cost per pig space	$38.00	% DDGS / Ton	14.3%	Pounds of gain / pig	266
% death & cull	3.82%	% Fat / Ton	4.1%	Days to market	165
Veterinary $/pig	$3.15	% Premix / ton	2.30%	Turns / year / pig space	2.14
Interest rate	0.0475	Tons of complete feed	736.82	Number of lean futures contracts	12.12
Freight in	$1.00	Bushels of corn	15,683.65	SEW BEGIN "21 WEEKS	12/7/2009
Freight out	$1.50	Tons of SBM	145.15	SEW "ALL OUT BY 24 WEEKS	12/28/2009
Freight Insurance	$0.00	Tons of DDGS	105.36	**SEW ALL OUT**	**12/25/2009**
Check off/ Vol PPC	$0.64			SEW by days to market&ADG	December 25, 2009
LRP Insurance quote	$0.00	feed cost			
Futures price/cwt.	**$70.00**	feed cost/ton	$228.07		
Futures Basis/cwt.	$4.00	feed cost/lb. of gain	$0.274	CAPITAL NEEDED	$337,020.11
Expected G&Y Prem/cwt	$5.32				
Adjusted Lean Price	$71.32	purchase price @ 55%	$38.50	$15	$73.49
Adjusted Live Price	**$54.20**	breakeven+$5	$68.49	$20	$75.99
PACKER	Tyson	breakeven+$10	$70.99	$25	$78.49

Margin

- Again…..can't control the market
- Can control margin or exposure!

Health Risk Breakdown

- Vaccines - Your control
  - Prrs, Myco, Ileitis, Salmonella, ect.
- Genetics – Your control
  - Sire lines, female, company
- Illness- No control
  - Air bone, bio-security failure, vaccine choice or not
- Bio-security – Your control
  - So easy, but yet so hard!


03/18/2009


03/18/2009


03/18/2009


WHY DO I HAVE HOLES IN MY CURTIN?


WHY DO I HAVE BIRDS IN MY BUILDING?
BIRD NEST!


WHAT IF SUPPLIES WERE STOLEN?
DURA DOOR
DO NOT ENTER
HELP PREVENT DISEASE

People Risk Breakdown

- Growers
- Feed Delivery
- Trucking Movements
- Supervisors

Affect of People

3 P's Risk-

- People Risk
- Production Risk
- Performance Risk

- We try to manage the 3 P's everyday.

Production Risk!

Feed is largest production cost!

- Q: How do you manage FEED?

- A: Manage PRODUCTION!
  - Improve ADG, F/C, marketed subs, death loss
  - Market more lbs/ft²/year with same space & same time!

Proven System (Standard)

- Daily chore routine
  - Chore 2X/day
  - Feed, Water, Air, Look at every pig every day
  - Timely treating & removal to recovery pens
    - Color scheme for treated pigs (Green,Blue,Red)

Everyday we must……

- **FEED**
  - Correct/timely reporting of bin levels
  - Feeder adjustments
- **WATER**
  - Fix leaking nipples/waters
  - Monitor usage
- **AIR**
  - Inlets functioning properly
  - Pit, wall, stir fans working properly
- **SEE EVERY PIG**
  - Get every pig up everyday
  - Treat and sort everyday

Performance Risk!

- What affects performance?
  - Temperature

Performance Risk!

- What affects performance?
  - Temperature
  - Feeder settings

Performance Risk!

- What affects performance?
  - Temperature
  - Feeder settings
  - Empty or hung up bulk bins

Performance Risk!

- What affects performance?
  - Temperature
  - Feeder settings
  - Empty bulk bins
  - Pig treatments

Performance Risk!

- What affects performance?
  - Temperature
  - Feeder settings
  - Empty bulk bins
  - Pig treatments
  - Junk Hogs

Junk Hogs

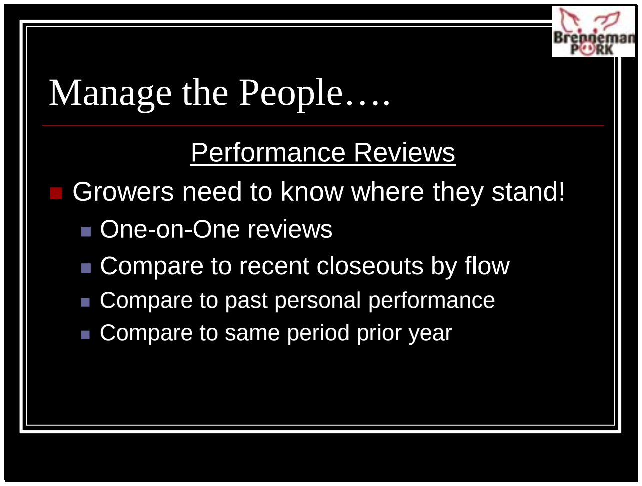
Performance Risk!

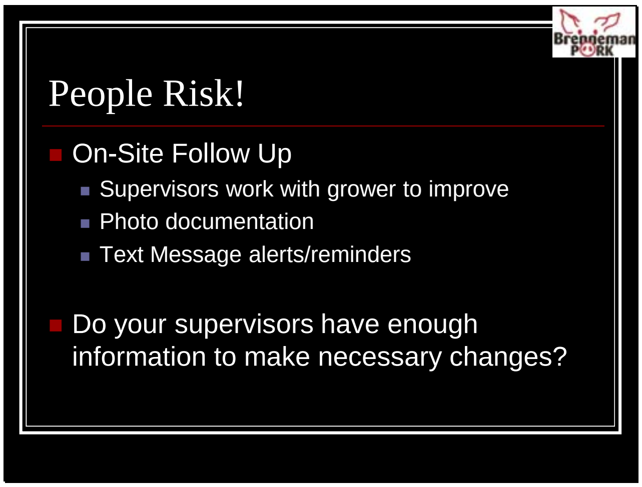
- What affects performance?
  - Temperature
  - Feeder settings
  - Empty bulk bins
  - Pig treatments
  - Junk Hogs

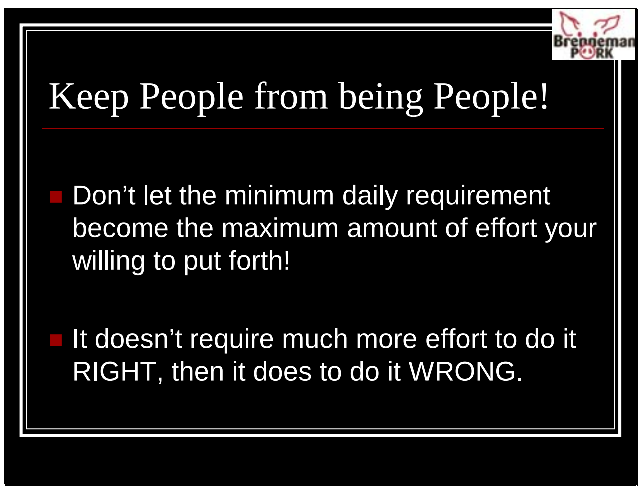
<u>Who is responsible for all of the above?</u>

- It's the **<u>PEOPLE</u>**!

People Risk!


Brenneman PORK
Manage the People….
Performance Reviews
Growers need to know where they stand!
One-on-One reviews
Compare to recent closeouts by flow
Compare to past personal performance
Compare to same period prior year


Brenneman PORK
People Risk!
On-Site Follow Up
Supervisors work with grower to improve
Photo documentation
Text Message alerts/reminders
Do your supervisors have enough information to make necessary changes?


Brenneman PORK
Keep People from being People!
Don’t let the minimum daily requirement become the maximum amount of effort your willing to put forth!
It doesn’t require much more effort to do it RIGHT, then it does to do it WRONG.

Know your Business…

- Detailed cost
- Know & Compare Growers
- Know the Pigs

Meta Farms & FBS Transaction Plus

Always margin to gain on every Site!

- Compare Good, Bad & Great

- **YOU** can **CONTROL** what happens on site

Cost of Feed Conversion

- What is the difference between 2.20 FC to 2.30 FC???
- Let's look at margin calculator!

Margin Calculator

Profit Margin

INPUT DATA		EXPENSE /PIG		INCOME / PIG	
Date Purchased	July 13, 2009	Purchase	$37.00	Lean price	$138.60
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Pig price	$37.00	Pig space	$17.72	**Gross revenue**	**$149.77**
Pig weight in	14	death & cull	$4.76		
Pig weight out	280	Interest expense	$1.71	**Net return /Pig**	
Average daly gain	1.61	Other variable	$6.29	profit / pig	**$12.53**
Feed conversion	**2.30**	**Total Expense/Pig**	**$137.24**	profit / group	$28,928.21
		Cost /cwt live	$49.01	annual return to facility	$62,031.24
Corn price$/bushel	**$4.00**	Cost /cwt lean	$64.49	return on investment	8.78%
Bean meal $/ton	**$290.00**				
DDGS $/ton	**$115.00**				
Fat $ / ton	**$550.00**	**Feed Data**		**Pig Group Data**	
Premix $/ton complete feed	$30.00	Ingredients		Number of pigs / fill	2400
Feed drug $/ton	$4.80	% Corn / ton	59.6%	Number of pigs death & cull	91.68
Grind mix & deliver/ton	$12.00	% SBM / ton	19.7%	Number of pigs marketed	2308.32
Fixed cost per pig space	$38.00	% DDGS / Ton	14.3%	Pounds of gain / pig	266
% death & cull	3.82%	% Fat / Ton	4.1%	Days to market	165
Veterinary $/pig	$3.15	% Premix / ton	2.30%	Turns / year / pig space	2.14
Interest rate	0.0475	Tons of complete feed	706.12	Number of lean futures contracts	12.12
Freight in	$1.00	Bushels of corn	15,030.16	SEW BEGIN "21 WEEKS	12/7/2009
Freight out	$1.50	Tons of SBM	139.10	SEW "ALL OUT BY 24 WEEKS	12/28/2009
Freight Insurance	$0.00	Tons of DDGS	100.97	**SEW ALL OUT**	**12/25/2009**
Check off/ Vol PPC	$0.64			SEW by days to market&ADG	December 25, 2009
LRP Insurance quote	$0.00	feed cost			
Futures price/cwt.	**$70.00**	feed cost/ton	$228.07		
Futures Basis/cwt.	$4.00	feed cost/lb. of gain	$0.262	CAPITAL NEEDED	$329,375.65
Expected G&Y Prem/cwt	$5.32				
Adjusted Lean Price	$71.32	purchase price @ 55%	$38.50	$15	$71.99
Adjusted Live Price	**$54.20**	breakeven+$5	$66.99	$20	$74.49
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Pig weight out	280	Interest expense	$1.67	**Net return /Pig**	
Average daly gain	1.61	Other variable	$6.29	profit / pig	**$15.72**
Feed conversion	**2.20**	**Total Expense/Pig**	**$134.05**	profit / group	$36,280.66
		Cost /cwt live	$47.88	annual return to facility	$77,797.22
Corn price$/bushel	**$4.00**	Cost /cwt lean	$63.00	return on investment	11.28%
Bean meal $/ton	**$290.00**				
DDGS $/ton	**$115.00**				
Fat $ / ton	**$550.00**	**Feed Data**		**Pig Group Data**	
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Futures Basis/cwt.	$4.00	feed cost/lb. of gain	$0.251	CAPITAL NEEDED	$321,731.18
Expected G&Y Prem/cwt	$5.32				
Adjusted Lean Price	$71.32	purchase price @ 55%	$38.50	$15	$70.50
Adjusted Live Price	**$54.20**	breakeven+$5	$65.50	$20	$73.00
PACKER	Tyson	breakeven+$10	$68.00	$25	$75.50

$3/hd in Feed Conversion Improvement!

Cost of Average Daily Gain

- What is the difference between 1.60 to 1.50 ADG??

Margin Calculator

Profit Margin

INPUT DATA		EXPENSE /PIG		INCOME / PIG	
Date Purchased	July 13, 2009	Purchase	$37.00	Lean price	$138.60
Number of pigs purchased	2400	Feed	$69.77	Grade add	$11.17
Pig price	$37.00	Pig space	$17.72	**Gross revenue**	**$149.77**
Pig weight in	14	death & cull	$4.76		
Pig weight out	280	Interest expense	$1.71	**Net return /Pig**	
Average daly gain	**1.61**	Other variable	$6.29	profit / pig	**$12.53**
Feed conversion	2.30	**Total Expense/Pig**	**$137.24**	profit / group	$28,928.21
		Cost /cwt live	$49.01	annual return to facility	$62,031.24
Corn price$/bushel	**$4.00**	Cost /cwt lean	$64.49	return on investment	8.78%
Bean meal $/ton	**$290.00**				
DDGS $/ton	**$115.00**				
Fat $ / ton	**$550.00**	**Feed Data**		**Pig Group Data**	
Premix $/ton complete feed	$30.00	Ingredients		Number of pigs / fill	2400
Feed drug $/ton	$4.80	% Corn / ton	59.6%	Number of pigs death & cull	91.68
Grind mix & deliver/ton	$12.00	% SBM / ton	19.7%	Number of pigs marketed	2308.32
Fixed cost per pig space	$38.00	% DDGS / Ton	14.3%	Pounds of gain / pig	266
% death & cull	3.82%	% Fat / Ton	4.1%	Days to market	165
Veterinary $/pig	$3.15	% Premix / ton	2.30%	Turns / year / pig space	2.14
Interest rate	0.0475	Tons of complete feed	706.12	Number of lean futures contracts	12.12
Freight in	$1.00	Bushels of corn	15,030.16	SEW BEGIN "21 WEEKS	12/7/2009
Freight out	$1.50	Tons of SBM	139.10	SEW "ALL OUT BY 24 WEEKS	12/28/2009
Freight Insurance	$0.00	Tons of DDGS	100.97	**SEW ALL OUT**	**12/25/2009**
Check off/ Vol PPC	$0.64			SEW by days to market&ADG	December 25, 2009
LRP Insurance quote	$0.00	feed cost			
Futures price/cwt.	**$70.00**	feed cost/ton	$228.07		
Futures Basis/cwt.	$4.00	feed cost/lb. of gain	$0.262	CAPITAL NEEDED	$329,375.65
Expected G&Y Prem/cwt	$5.32				
Adjusted Lean Price	$71.32	purchase price @ 55%	$38.50	$15	$71.99
Adjusted Live Price	**$54.20**	breakeven+$5	$66.99	$20	$74.49
PACKER	Tyson	breakeven+$10	$69.49	$25	$76.99

Margin Calculator

Profit Margin

INPUT DATA		EXPENSE /PIG		INCOME / PIG	
Date Purchased	July 13, 2009	Purchase	$37.00	Lean price	$138.60
Number of pigs purchased	2400	Feed	$69.77	Grade add	$11.17
Pig price	$37.00	Pig space	$18.86	**Gross revenue**	**$149.77**
Pig weight in	14	death & cull	$4.80		
Pig weight out	280	Interest expense	$1.71	**Net return /Pig**	
Average daly gain	**1.51**	Other variable	$6.29	profit / pig	**$11.35**
Feed conversion	2.30	**Total Expense/Pig**	**$138.42**	profit / group	$26,198.31
		Cost /cwt live	$49.44	annual return to facility	$52,784.49
Corn price$/bushel	**$4.00**	Cost /cwt lean	$65.05	return on investment	7.89%
Bean meal $/ton	**$290.00**				
DDGS $/ton	**$115.00**				
Fat $ / ton	**$550.00**	**Feed Data**		**Pig Group Data**	
Premix $/ton complete feed	$30.00	Ingredients		Number of pigs / fill	2400
Veterinary $/pig	$3.15	% Premix / ton	2.30%	Turns / year / pig space	2.01
Interest rate	0.0475	Tons of complete feed	706.12	Number of lean futures contracts	12.12
Freight in	$1.00	Bushels of corn	15,030.16	SEW BEGIN "21 WEEKS	12/7/2009
Freight out	$1.50	Tons of SBM	139.10	SEW "ALL OUT BY 24 WEEKS	12/28/2009
Freight Insurance	$0.00	Tons of DDGS	100.97	**SEW ALL OUT**	**1/5/2010**
Check off/ Vol PPC	$0.64			SEW by days to market&ADG	January 5, 2010
LRP Insurance quote	$0.00	feed cost			
Futures price/cwt.	**$70.00**	feed cost/ton	$228.07		
Futures Basis/cwt.	$4.00	feed cost/lb. of gain	$0.262	CAPITAL NEEDED	$332,213.97
Expected G&Y Prem/cwt	$5.32				
Adjusted Lean Price	$71.32	purchase price @ 55%	$38.50	$15	$72.55
Adjusted Live Price	**$54.20**	breakeven+$5	$67.55	$20	$75.05
PACKER	Tyson	breakeven+$10	$70.05	$25	$77.55

$1/hd in ADG Improvement .1!

Production Opportunity

- Decrease FC by .1
- Increase ADG by .1
- Decrease Mortality & Culls by 1%

Margin Calculator

Profit Margin

INPUT DATA		**EXPENSE /PIG**		**INCOME / PIG**	
Date Purchased	July 13, 2009	Purchase	$37.00	Lean price	$138.60
Number of pigs purchased	2400	Feed	$69.77	Grade add	$11.17
Pig price	$37.00	Pig space	$18.98	**Gross revenue**	**$149.77**
Pig weight in	14	death & cull	$6.06		
Pig weight out	280	Interest expense	$1.71	**Net return /Pig**	
Average daly gain	**1.50**	Other variable	$6.29	profit / pig	**$9.97**
Feed conversion	**2.30**	**Total Expense/Pig**	**$139.81**	profit / group	$22,763.46
		Cost /cwt live	$49.93	annual return to facility	$45,568.53
Corn price$/bushel	**$4.00**	Cost /cwt lean	$65.70	return on investment	6.78%
Bean meal $/ton	**$290.00**				
DDGS $/ton	**$115.00**				
Fat $ / ton	**$550.00**	**Feed Data**		**Pig Group Data**	
Premix $/ton complete feed	$30.00	Ingredients		Number of pigs / fill	2400
Feed drug $/ton	$4.80	% Corn / ton	59.6%	Number of pigs death & cull	115.68
Grind mix & deliver/ton	$12.00	% SBM / ton	19.7%	Number of pigs marketed	2284.32
Fixed cost per pig space	$38.00	% DDGS / Ton	14.3%	Pounds of gain / pig	266
% death & cull	**4.82%**	% Fat / Ton	4.1%	Days to market	177
Veterinary $/pig	$3.15	% Premix / ton	2.30%	Turns / year / pig space	2.00
Interest rate	0.0475	Tons of complete feed	698.77	Number of lean futures contracts	11.99
Freight in	$1.00	Bushels of corn	14,873.89	SEW BEGIN "21 WEEKS	12/7/2009
Freight out	$1.50	Tons of SBM	137.66	SEW "ALL OUT BY 24 WEEKS	12/28/2009
Freight Insurance	$0.00	Tons of DDGS	99.92	**SEW ALL OUT**	**1/6/2010**
Check off/ Vol PPC	$0.64			SEW by days to market&ADG	January 6, 2010
LRP Insurance quote	$0.00	feed cost			
Futures price/cwt.	**$70.00**	feed cost/ton	$228.07		
Futures Basis/cwt.	$4.00	feed cost/lb. of gain	$0.262	CAPITAL NEEDED	$335,536.58
Expected G&Y Prem/cwt	$5.32				
Adjusted Lean Price	$71.32	purchase price @ 55%	$38.50	$15	$73.20
Adjusted Live Price	**$54.20**	breakeven+$5	$68.20	$20	$75.70
PACKER	Tyson	breakeven+$10	$70.70	$25	$78.20

Margin Calculator

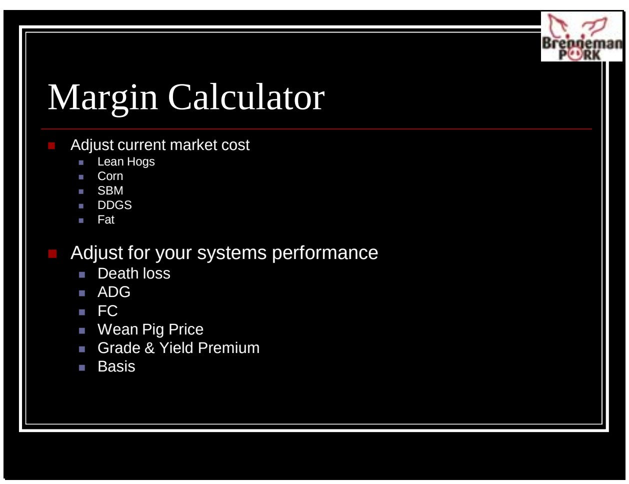
Profit Margin

INPUT DATA		**EXPENSE /PIG**		**INCOME / PIG**	
Date Purchased	July 13, 2009	Purchase	$37.00	Lean price	$138.60
Number of pigs purchased	2400	Feed	$66.73	Grade add	$11.17
Pig price	$37.00	Pig space	$17.83	**Gross revenue**	**$149.77**
Pig weight in	14	death & cull	$4.64		
Pig weight out	280	Interest expense	$1.67	**Net return /Pig**	
Average daly gain	**1.60**	Other variable	$6.29	profit / pig	**$15.61**
Feed conversion	**2.20**	**Total Expense/Pig**	**$134.17**	profit / group	$36,023.02
		Cost /cwt live	$47.92	annual return to facility	$76,778.99
Corn price$/bushel	**$4.00**	Cost /cwt lean	$63.05	return on investment	11.19%
Bean meal $/ton	**$290.00**				
DDGS $/ton	**$115.00**				
Fat $ / ton	**$550.00**	**Feed Data**		**Pig Group Data**	
Premix $/ton complete feed	$30.00	Ingredients		Number of pigs / fill	2400
Feed drug $/ton	$4.80	% Corn / ton	59.6%	Number of pigs death & cull	91.68
Grind mix & deliver/ton	$12.00	% SBM / ton	19.7%	Number of pigs marketed	2308.32
Fixed cost per pig space	$38.00	% DDGS / Ton	14.3%	Pounds of gain / pig	266
% death & cull	**3.82%**	% Fat / Ton	4.1%	Days to market	166
Veterinary $/pig	$3.15	% Premix / ton	2.30%	Turns / year / pig space	2.13
Check off/ Vol PPC	$0.64			SEW by days to market&ADG	December 26, 2009
LRP Insurance quote	$0.00	feed cost			
Futures price/cwt.	**$70.00**	feed cost/ton	$228.07		
Futures Basis/cwt.	$4.00	feed cost/lb. of gain	$0.251	CAPITAL NEEDED	$321,999.04
Expected G&Y Prem/cwt	$5.32				
Adjusted Lean Price	$71.32	purchase price @ 55%	$38.50	$15	$70.55
Adjusted Live Price	**$54.20**	breakeven+$5	$65.55	$20	$73.05
PACKER	Tyson	breakeven+$10	$68.05	$25	$75.55

$5/hd in production/performance gains

Don't wait for the market to move!

- Move your people!
- Affect performance!
- Affect production!



Brenneman PORK
Margin Calculator
Adjust current market cost
Lean Hogs
Corn
SBM
DDGS
Fat
Adjust for your systems performance
Death loss
ADG
FC
Wean Pig Price
Grade & Yield Premium
Basis

Margin Opportunity

- Always opportunity to improve your margin in performance and production if you…

Focus on the **PEOPLE**!!

Product Promotion!!!

- Start local- Pork Producers
- Get involved

THANK YOU

Brenneman PORK

SWINE PROFITABILITY CONFERENCE

February 2, 2010

"What Does the Future Hold for the U.S. Swine Industry?"

by

Steve Meyer
Paragon Economics
Des Moines, IA

What Does the Future Hold for the U.S. Swine Industry?

Steve Meyer
Paragon Economics, Des Moines, IA

KSU Swine Profitability Conf -- Jan. 2010

Economic Outlook – Where Are We Now Going?

Steve R. Meyer, Ph.D.
Paragon Economics, Inc.

Paragon Economics, Inc.
From information, knowledge

First – The Morrell-Sioux City closure

- Effective April 20
- Current capacity: 14,000 head/day but have been killing around 10,000/day
- Plant was built in 1959 – relatively old but far from the oldest in the U.S.
- LIMITED PROCESSING – primarily a kill-cut facility
- Location is no longer a positive for Sioux City – especially without the stockyards
- COMPLETELY FORESEEABLE!!!!!

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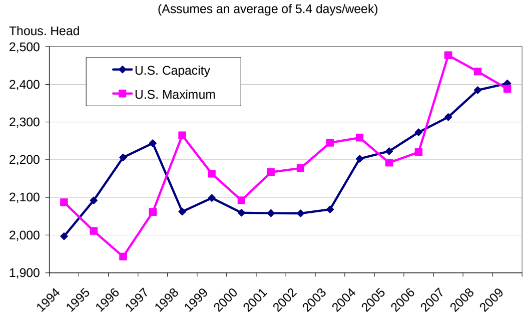
From information, knowledge

2009: Max weekly kill was below capacity

. . . For the industry as a whole

U.S. WEEKLY SLAUGHTER CAPACITY
(Assumes an average of 5.4 days/week)



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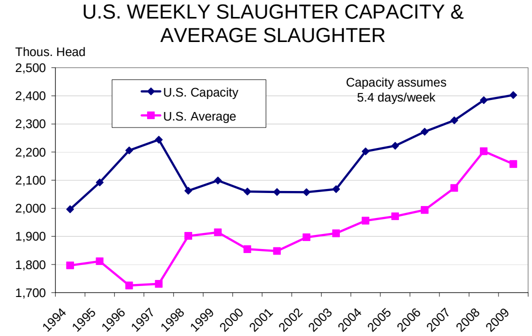
Not good BUT NOTHING LIKE 1998!!!

. . . Note the drop in capacity utilization in '09



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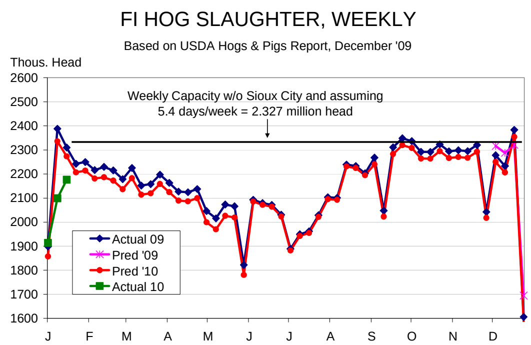
Capacity could still get a bit tight in Q4



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Impacts?

- One less plant is not the same as one less buyer or one less company
- Still many selling opportunities in the SD-Minn-IA-Neb area
- Morrell say it will still honor marketing contracts – freight???
- Negligible price impact
- MUST BE CAREFUL ABOUT OUTPUT!!!!
- Why did this happen? Costs and MCOOL

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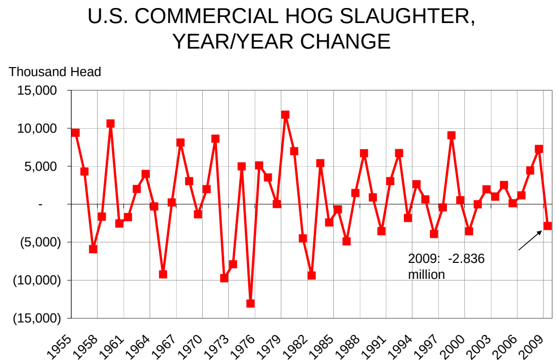
From information, knowledge

255 days @ 10k/day = 2.5 million hogs



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This closure is MORE of the long-run impact

- For each 1 million head fewer market hogs produced in the U.S., there will be
  - 331 fewer jobs in pork production
  - 681 fewer jobs in pork processing
  - 1,142 fewer jobs in the rest of agriculture
  - **2,154 fewer jobs – mostly rural!**
- And we are in the process of reducing output by about 10 million head
  - **21,540 fewer jobs – mainly in rural areas**

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To paraphrase the Clinton campaign:

"IT'S **STILL** **COSTS**, STUPID!"

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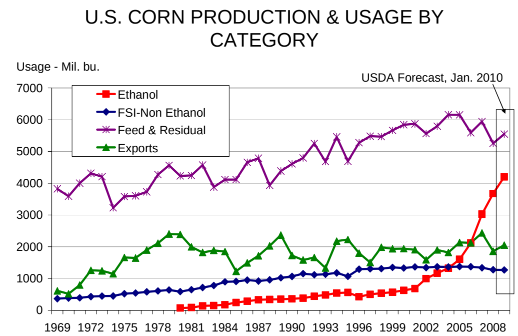
Corn usage for ethanol up to 4.2 bil. bu. . . .
. . . +14.3% vs. '08; +525 mil. bu. more in '10



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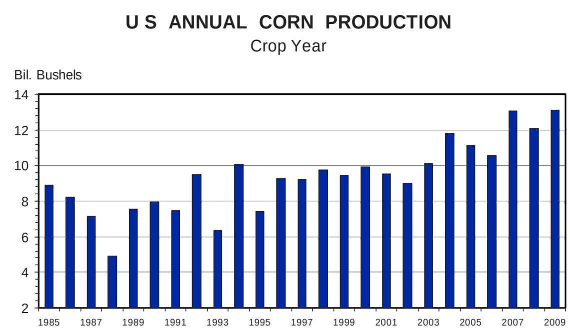
USDA now says we have a record corn crop . . .



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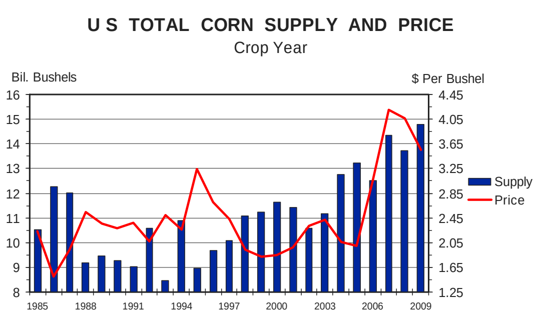
Record-high availability, price down 19% . . .
. . . but still near $3.50/bu per USDA



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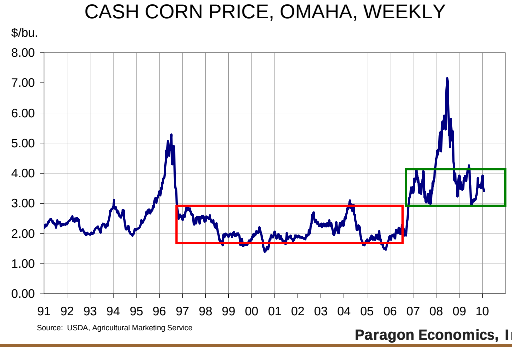
Cash corn remains in a new "normal" range . .
. . . But moved to the upper half since harvest



Source: USDA, Agricultural Marketing Service

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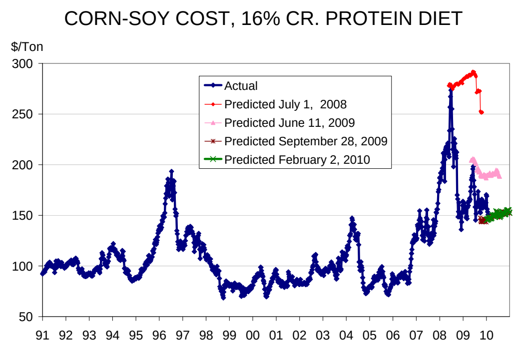
Feed cost – lowest since September



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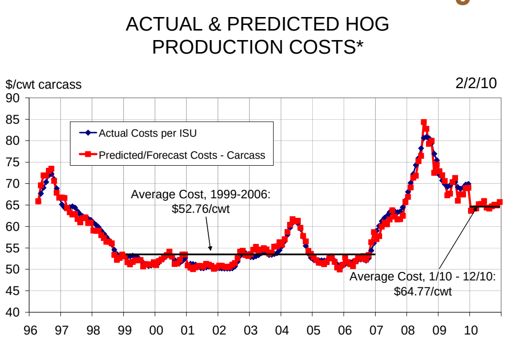
Hog production costs, though below 2008 . . .
. . . +23% from historical levels through 2010



*Based on relationsip between ISU Estimated Costs & Returns data and historic Omaha corn and Decatur soybean meal prices

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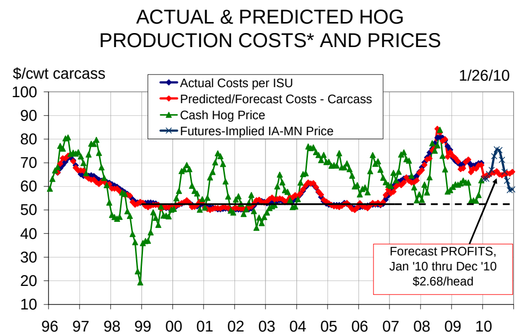
We would have seen NO LOSSES thru '09 . . .
. . . if not for 30% higher costs!



*Based on relationship between ISU Estimated Costs & Returns data and historic Omaha corn and Decatur soybean meal prices

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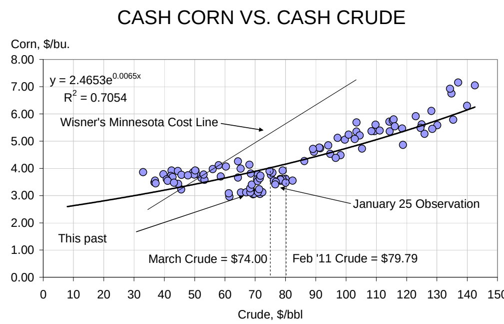
Corn:oil relationship implies $4.00 to $4.20
. . . So there is yet upside potential for corn



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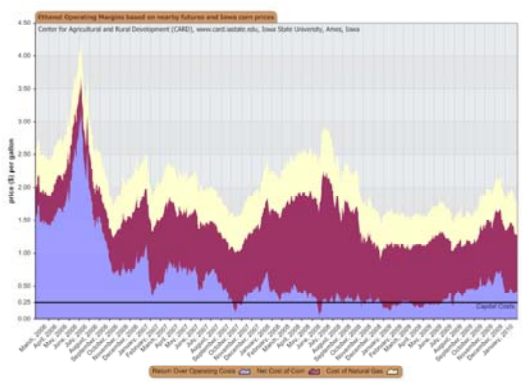
Positive ethanol margins will drive corn bids



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Ethanol production capacity is still growing

- As of January 19, 2010 per RFA:
  - 191 plants operating -- capacity of 13.08 bil. gal./yr.
  - 13 plants expanding or under construction – capacity of 1.43 bil. gal./yr.
- Current plants could use 4.65 bil. bushels -- All plants would use 5.2 bil. bushels
- Already have enough to exceed E10 for all U.S. gasoline – thus the push for E15
  - RFS has promised more than the market can deliver!

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We can't "unring" the ethanol bell

- FAPRI/TAMU study – looked at 2011-2018
  - Removing the BTC lowers corn price 0.6%
  - Removing the tariff lowers corn price 2.8%
  - Removing the RFS lowers corn price 4.6%
  - Removing all three lowers corn price 13.1%
  - Will BTC & tariff be allowed to expire in '10?
- Bottom Line: The plants are in place – they will be operated by someone
- STILL NEED – an automatic RFS trigger for drought, especially if oil is cheap

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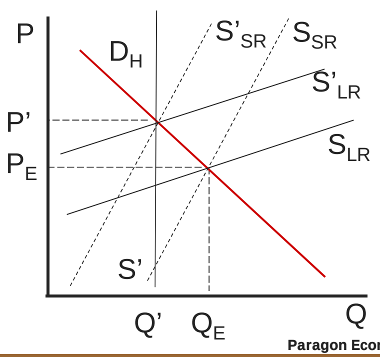
We are in the process of reducing supply . . .
. . . Not just Q supplied -- the entire line!



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We are in the midst of that process now

- Chicken production is down 3.3% for '09
- Turkey production is down 6.0% for '09
- Pork production is down 1.8% for '09
- Beef production is down 2.7% for '09
- Chicken reductions are slowing and turkey will, too – shorter reaction time
- Pork reduction will get larger -- ??
- Beef reduction may not get larger but will last MUCH longer

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So what can producers do about costs?

- Efficiency, efficiency, efficiency – Even higher incentives for productivity growth!
- Manage feed ingredient costs
  - Corn near $3 will be CHEAP for next 5-8 yrs.
  - Ditto for meal <$280 or $290
- Backward integrate into grain production – go from specialized hogs to diversified
- Carry a "strategic reserve"
  - 2-3 months of corn to get through Aug & Sept some year – soon?
  - Soybean meal?

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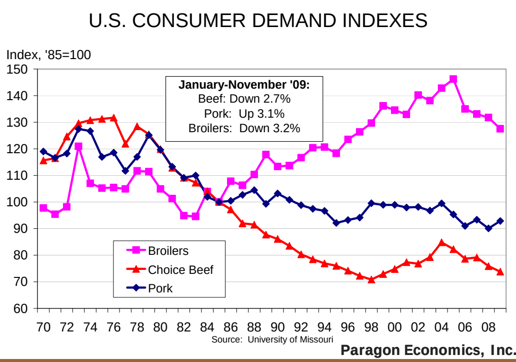
Domestic pork demand has grown in '09 . . .
. . . But more important: The trends are BAD!



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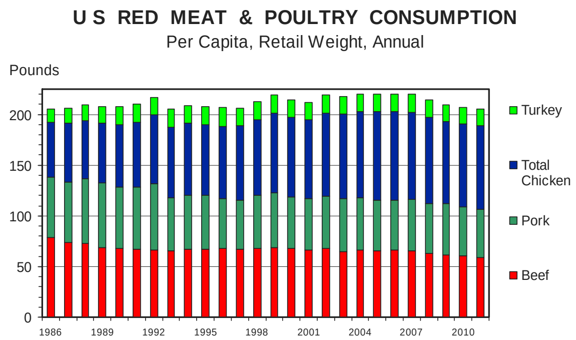
Have we found the saturation point for meat?



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2008 exports: A confluence of positives. . .

- Record-low U.S. dollar made U.S. product relatively cheap
- China/Hong Kong was the driver
  - Booming economy and rising middle class
  - Death losses in 2006-07 due to disease, earthquake, harsh winters = pork shortage
  - Olympic games
- Economic growth in other countries
- Strong Canadian dollar

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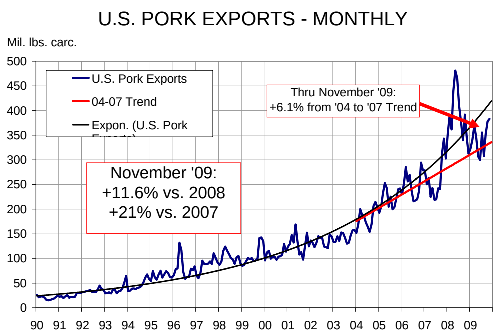
Remarkably strong 2009 exports . . .

. . . Given the obstacles we have faced!!!



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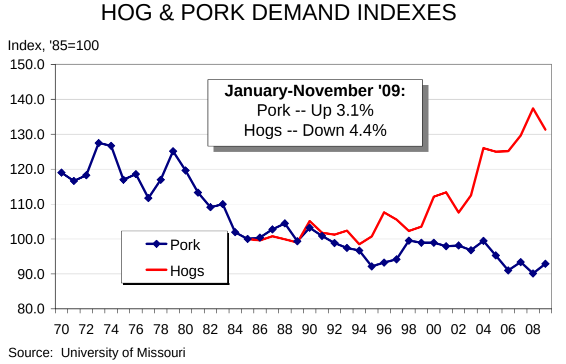
'09 exports pulled HOG demand down vs. '08



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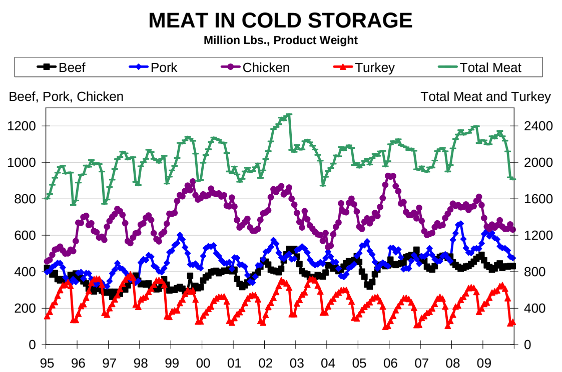
Supply: Frozen stocks have fallen sharply!



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FP and MH imports are down sharply . . .
. . . But are equal to the levels I expected

LIVE HOG IMPORTS FROM CANADA

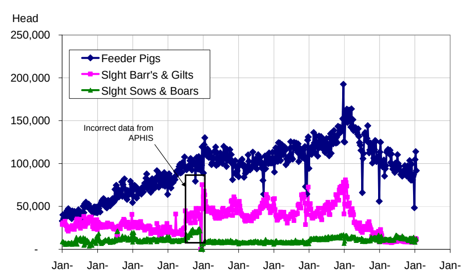
2009

MH: -67%

FP: -25%

SB: -0.5%

All: -30%



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Sept Hogs & Pigs was about as expected . . .
. . .Evidence of turning the corner?

USDA Quarterly Hogs and Pigs Report

September 25, 2009

Category	2008	2009	2009 as Pct of 2008	Pre-Report Estimates	Actual - Estimate
Inventories on September 1[1]					
All hogs and pigs	68,196	66,626	97.7	98.2	-0.5
Kept for breeding	6,061	5,874	96.9	97.4	**-0.5**
Kept for market	62,135	60,752	97.8	98.3	-0.5
Under 60 lbs.	22,683	21,837	96.3	98.3	-2.0
60-119 lbs.	15,397	15,078	97.9	98.3	-0.4
120-179 lbs.	12,855	12,674	98.6	98.8	-0.2
180 lbs. and over	11,201	11,163	99.7	99.0	0.7
Farrowings[2]					
June-Aug sows farrowed	3,075	2,966	**96.5**	96.8	-0.3
Sep-Nov Intentions	3,028	2,935	96.9	97.3	-0.4
Dec-Feb Intentions	3,024	2,930	96.9	96.9	**0.0**
June-Aug Pig Crop1	29,240	28,772	**98.4**	98.1	0.3
June-Aug pigs saved per litter	9.51	9.70	**102.0**	101.4	**0.6**

[1]Thousand head [2]Thousand litters

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Then came December's report . . .

USDA Quarterly Hogs and Pigs Report

December 30, 2009

Category	2008	2009	2009 as Pct of 2008	Pre-Report Estimates	Actual - Estimate
Inventories on December 1[1]					
All hogs and pigs	67,148	65,807	98.0	97.6	0.4
Kept for breeding	6,062	5,850	**96.5**	96.6	**-0.1**
Kept for market	61,087	59,957	98.2	97.7	0.5
Under 50 lbs.	19,428	19,085	98.2	98.1	0.1
50-119 lbs.	17,396	17,062	98.1	97.9	0.2
120-179 lbs.	12,731	12,529	98.4	97.7	0.7
180 lbs. and over	11,533	11,282	97.8	97.7	0.1
Farrowings[2]					
Sep-Nov sows farrowed	3,028	2,974	**98.2**	96.9	**1.3**
Dec-Feb Intentions	3,011	2,954	**98.1**	96.8	**1.3**
Mar-May Intentions	3,018	2,935	97.2	97.0	0.2
Sep-Nov Pig Crop1	28,771	28,833	**100.2**	98.8	1.4
Sep-Nov pigs saved per litter	9.50	9.70	**102.1**	101.9	0.2

[1]Thousand head [2]Thousand litters

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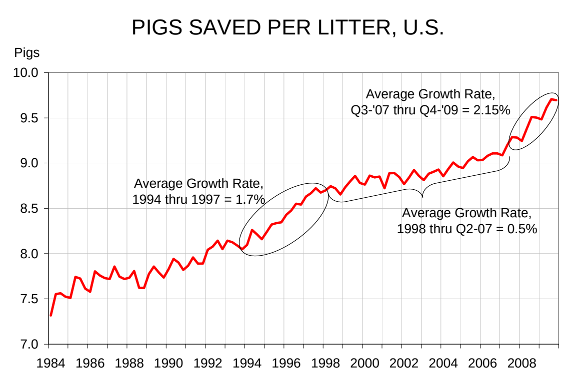
How long can productivity growth continue?



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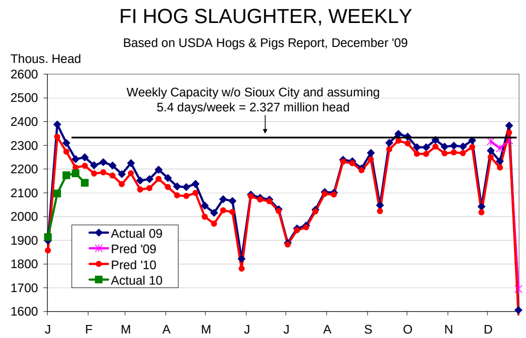
September H&P says '10 supplies . . .

. . . Will be VERY close to '09 supplies



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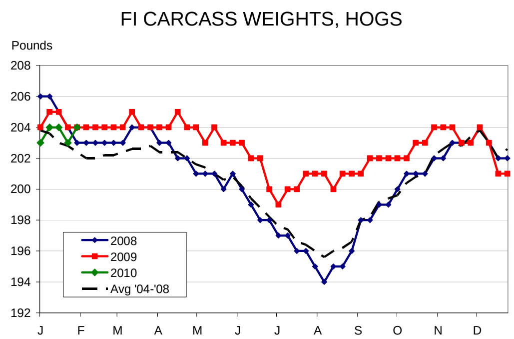
High weights added 1% to '09 production . . .

. . . But I expect 2010 weights to be LOWER



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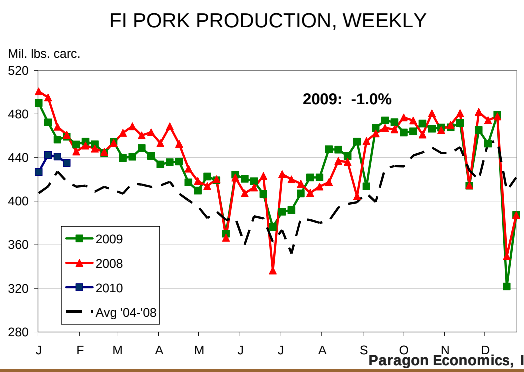
Net result: '09 pork prod only 0.9% lower

. . . And YTD '10 is down 7%



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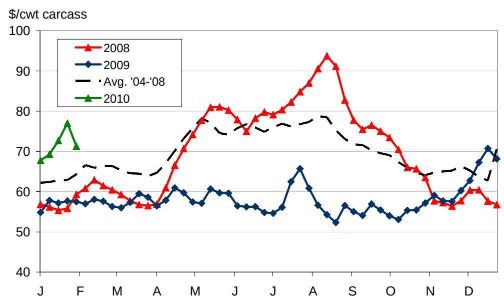
First cutout rally in Oct-Nov since '98 . . .

. . . A gain of nearly $18/cwt in Q4-09!

51-52% LEAN, PORK CUTOUT VALUE



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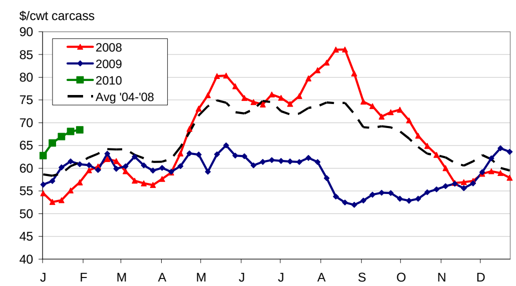
New packer discipline (??) means . . .

. . . Hog price changes have matched cutout

NATIONAL WTD. AVG. NET PRICE
ALL PURCHASE METHODS



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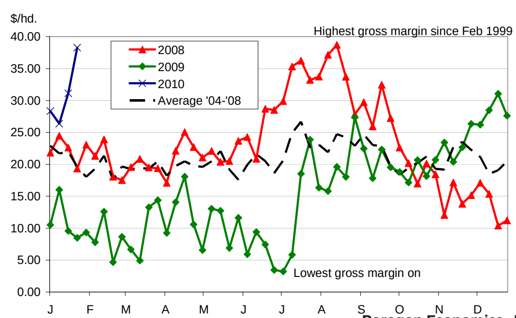
From information, knowledge

Packer margins: Very good since December . .

. . . And should support higher hog prices

PORK PACKERS' EST'D GROSS MARGIN



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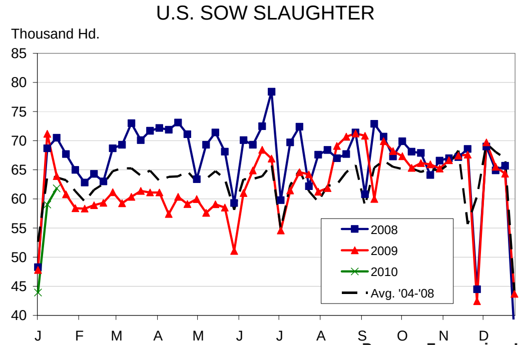
Sow slaughter back below 70k/wk. . . .

. . . Though a higher percent are U.S. sows



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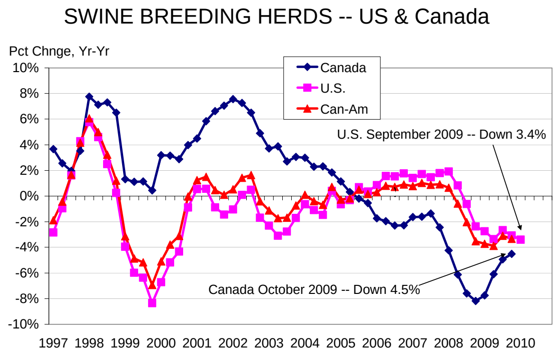
U.S. herd reduction sped up a bit in Dec . . .



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How much of a reduction do we need?

- We have to make up for:
  - ~7-8% productivity increase of circo vac's
  - 20-30% higher costs.
- Need a 12% reduction of the US/Canada sow herd from Oct '07 peak of 7.752 mil.
  - Would put US/Canada at 6.82 million head
  - Canada is already at 1.38 million and will cut farther – to 1.2 mil. or so
  - U.S. needs to go to **5.5 to 5.6 million**
- Dec 1: 5.856 million, down 6.1% vs. '07

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Why such a slow reaction?

- Producers WANT to be in this business – it has been good to them!
- Producers believed 2008 was the new reality???

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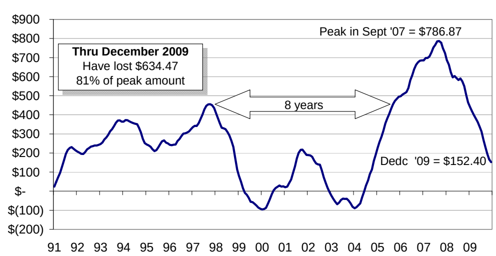
Producer equity was record high in '07 . . .
. . . but is now down by 81%

ACCUMULATED PROFITS
IOWA FARROW-TO-FINISH OPERATIONS
(Sum of the profits from selling one pig per month since January 1991)



Source: Paragon Economics, Inc. using data from Estimated Costs and Returns, Dr. John Lawrence, Department of Economics, Iowa State

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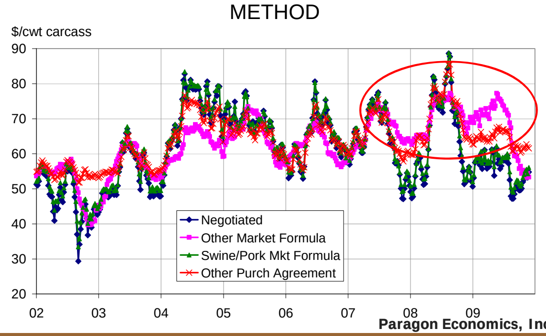
From information, knowledge

Futures: $10-$15 advantage many weeks . . .
. . . and OMF (feed prices) had advantage, too

MARKET HOG PRICES BY PRICING METHOD



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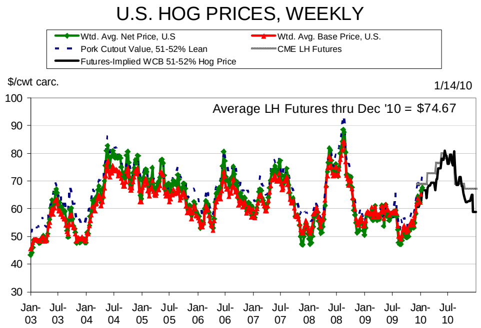
The LH futures "carrot" is good again!

. . . Though not as good as 2 weeks ago!



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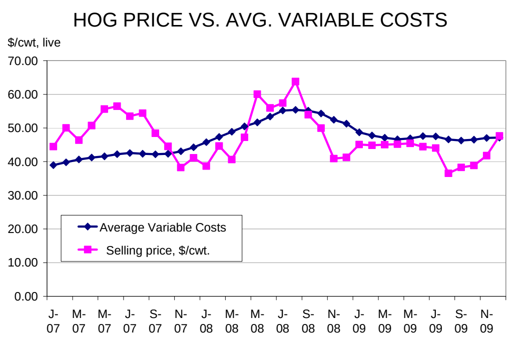
Prices have been close to AVC . . .

. . . Except in Q4-08 and Aug-Nov '09



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Supply forecasts

December 2009 Commercial Slaughter Forecasts

		Mizzou		ISU		LMIC		Meyer	
		Mil. Hd	% Chnge	Mil. Hd	% Chnge	Mil. Hd	% Chnge	Mil. Hd	% Chnge
2008	Year	116.452	6.7%						
2009	Q1	28.488	-3.8%	28.488	-3.8%	28.488	-3.8%	28.488	-3.8%
	Q2	27.063	-3.1%	27.063	-3.1%	27.063	-3.1%	27.063	-3.1%
	Q3	28.419	-1.0%	28.419	-1.0%	28.419	-1.0%	28.419	-1.0%
	Q4	29.670	-1.8%	29.912	-1.0%	29.607	-2.0%	29.489	-2.4%
	Year	113.640	-2.4%	113.882	-2.2%	113.577	-2.5%	113.459	-2.6%
2010	Q1	27.775	-2.5%	28.203	-1.0%	28.179	-1.1%	28.422	-0.2%
	Q2	26.520	-2.0%	27.776	-2.5%	26.792	-1.0%	26.706	-1.3%
	Q3	27.850	-2.0%	28.061	-1.5%	28.124	-1.0%	27.784	-2.2%
	Q4	28.900	-2.4%	27.776	-2.5%	29.238	-1.3%	28.916	-1.9%
	Year	111.045	-2.2%	111.815	-1.8%	112.332	-1.1%	111.828	-1.4%

Green figures are actual data from USDA. Red figures are based on partial USDA data. 12/30/09

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Price forecasts – Look at futures!

December 2009 Hogs & Pigs Price Forecasts

		Missouri	ISU	LMIC	Meyer	CME
		51-52% Lean, Live[1]	Ia-S. Mn. Live Price[1]	National Wtd Avg. Base Price	National Net Neg'd Price, Wtd. Avg.	CME Lean Hog Futures
						1/26/10
2009	Q1	56.15	56.80	58.11	57.22	$58.14**
	Q2	57.67	58.48	59.45	58.18	$59.03**
	Q3	53.84	58.93	54.01	52.39	$54.18**
	Q4	53.95*	53.85*	56.61*	55.54*	$56.27**
	Year	**55.95***	**57.04***	**57.05***	**55.83***	$56.91**
2010	Q1	59 - 63	62 - 66	56 - 59	58 - 62	66.48
	Q2	63 - 67	70 - 74	61 - 64	68 - 72	72.86
	Q3	66 - 70	69 - 73	65 - 68	66 - 70	74.92
	Q4	61 - 62	64 - 68	63 - 67	60 - 64	64.10
	Year	62 - 66	66 - 70	61 - 65	63 - 67	69.59

[1]Converted to carcass using a yield of 75% *Partial USDA data **Average of CME Lean Hog Index

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How do producers survive and prosper?

- Manage their MARGIN!
  - Feed costs
  - Hog prices
- Manage risk relative to your risk-bearing capacity
  - Right now – probably not high=hedge!
  - Future – maybe you can take more risk
- Most cannot afford to gamble on getting the highest price or margin!
- Financial management – Cash & credit

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What does all of this mean for the future?

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Where will we be in 2011 and beyond?

- The U.S. animal protein business will be smaller – a logical, predictable consequence of policy decisions.
  - Fewer processors needed – I had thought we might NOT lose a plant in 2010, but . .
  - Fewer suppliers
  - Fewer support service providers
- More scrutinized and regulated
- More dependent on international markets

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After the dust settles . . .

- There will be viable, competitive U.S. animal protein sectors – they will NOT disappear!
- They will be smaller than before '07
- Participants will have to be VERY good!
- Many operational choices will be limited – higher costs
- U.S. consumers will be forced to pay more for animal proteins in particular and food in general – Will they stand for it?

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Two other sources for my work:

CME's Daily Livestock Report

www.dailylivestockreport.com

National Hog Farmer's Weekly Preview

www.nationalhogfarmer.com

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From information, knowledge

…..Notes…..Notes…..Notes…..Notes

SWINE PROFITABILITY CONFERENCE

February 2, 2010

"Recent Breakthroughs in Lowering Cost of Production and Improving Margin Over Feed"

by

K-State Swine Team

Recent Breakthroughs in Lowering Cost of Production and Improving Margin Over Feed

Mike Tokach, Jim Nelssen, Bob Goodband, Joel DeRouchey, and Steve Dritz
K-State Swine Team

Welcome to the 2010 Swine Profitability Conference

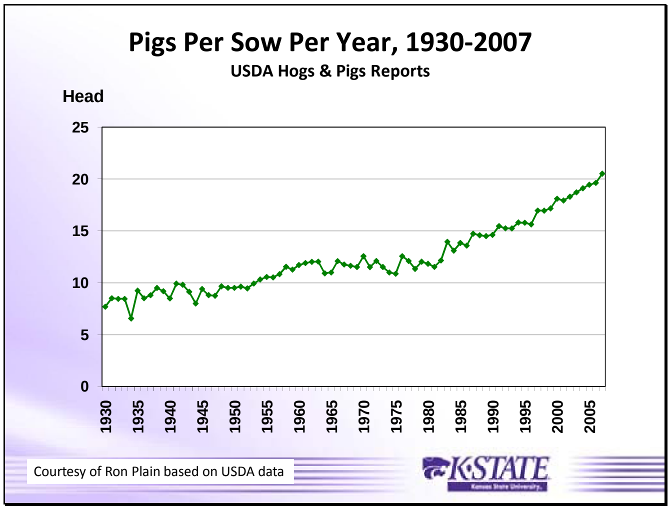
K-STATE
Kansas State University
Research and Extension

Lowering cost of production and improving margin over feed

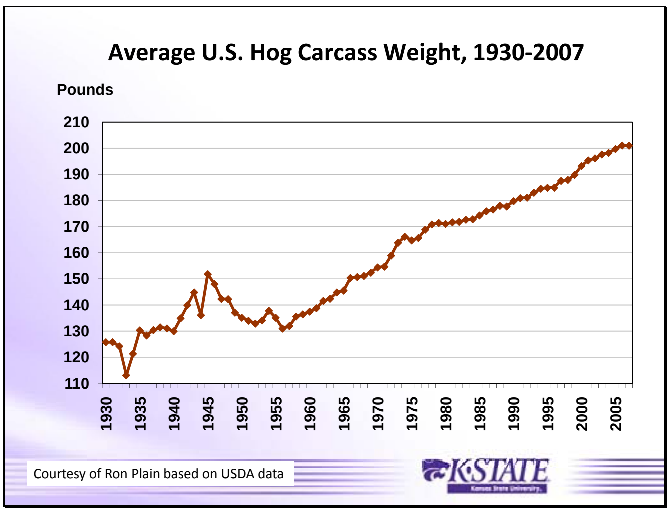
K-STATE
Kansas State University
Research and Extension

Needed for low cost and optimal margin

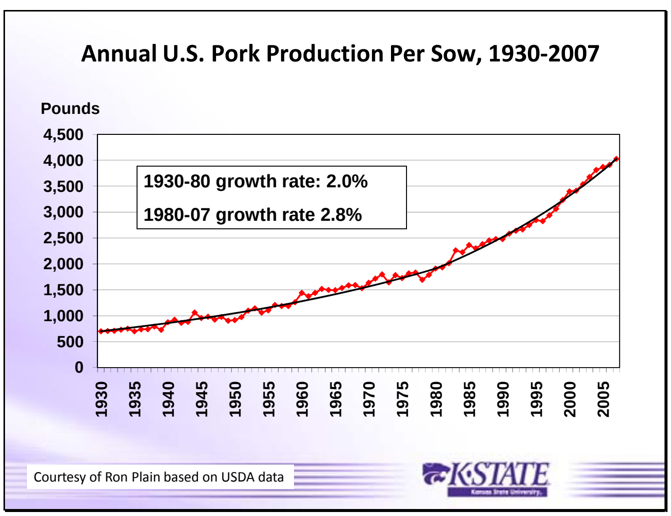
- Productivity
  - reproduction x genetics x health
- Health
- Pig care
- Feed cost (F/G x ingredient purchase)
- Marketing (weight x plan)



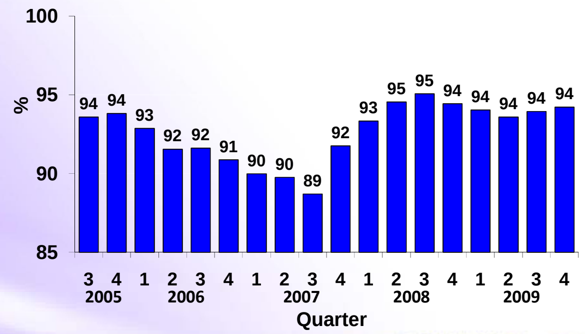
Pigs Per Sow Per Year, 1930-2007
USDA Hogs & Pigs Reports
Head
25
20
15
10
5
0
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
Courtesy of Ron Plain based on USDA data



Average U.S. Hog Carcass Weight, 1930-2007
Pounds
210
200
190
180
170
160
150
140
130
120
110
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
Courtesy of Ron Plain based on USDA data



Annual U.S. Pork Production Per Sow, 1930-2007
Pounds
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
1930-80 growth rate: 2.0%
1980-07 growth rate 2.8%
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
Courtesy of Ron Plain based on USDA data



Needed for low cost and optimal margin

- Productivity
  - reproduction x genetics x health
- Health
- Pig care
- Feed cost (F/G x ingredient purchase)
- Marketing (weight x plan)

Pig Care

- Daily chores
- Timely treatments
- Timely euthanasia

Needed for low cost and optimal margin

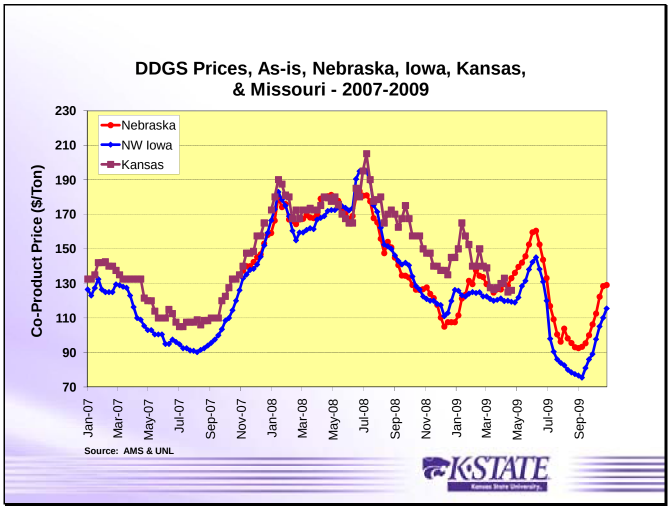
- Productivity
  - reproduction x genetics x health
- Health
- Pig care
- Feed cost (F/G x ingredient purchase)
- Marketing (weight x plan)

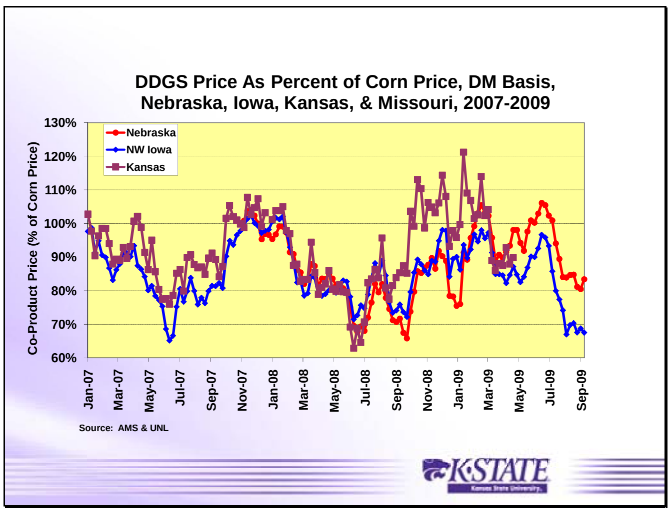
Feed cost

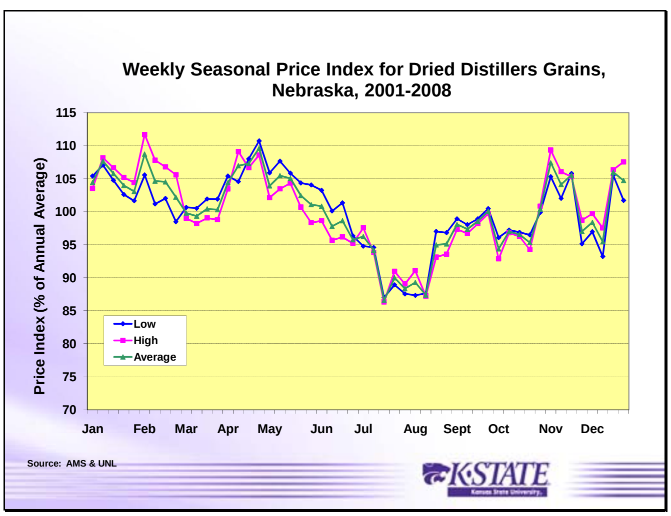
- DDGS (seasonality in Kansas)
  - Vomitoxin, IV (Triumph) - calculator
- Other opportunities (milo, wheat midds, etc)
- Particle size
- Don't include products without solid data
- Do what we do well in Kansas – aggressively control costs of all ingredients
- Feeder adjustment and space

DDGS calculators

- Simple calculator
  - Data\DDGS Economic calculator.xls
- Step-down calculator
  - ..\Data\DDGS calculator Step Down.xlsx


DDGS Prices, As-is, Nebraska, Iowa, Kansas, & Missouri - 2007-2009
Co-Product Price ($/Ton)
Nebraska
NW Iowa
Kansas
Source: AMS & UNL
K-STATE
Kansas State University


DDGS Price As Percent of Corn Price, DM Basis, Nebraska, Iowa, Kansas, & Missouri, 2007-2009
Co-Product Price (% of Corn Price)
Nebraska
NW Iowa
Kansas
Source: AMS & UNL
K-STATE
Kansas State University


Weekly Seasonal Price Index for Dried Distillers Grains, Nebraska, 2001-2008
Price Index (% of Annual Average)
Low
High
Average
Jan Feb Mar Apr May Jun Jul Aug Sept Oct Nov Dec
Source: AMS & UNL
K-STATE
Kansas State University

Mycotoxins and New Crop Corn

- Observations of black mold on corn in Kansas and surrounding states
  - Most test results have shown limited mycotoxin contamination
  - Deoxynivalenol (DON), also commonly known as vomitoxin, has been the most common this year
    - > 1 ppm may reduce feed intake and rate of gain
    - > 5 ppm may result in feed refusal
    - > 10 ppm may result in vomiting
- DDGS – 3 times the level of original corn level

Mycotoxins – What can we do?

- Collect a good sample to test if suspected
- Screen/clean the grain – molds are in the dust and stressed small kernels
- Blend contaminated grain with clean grain to get below a maximum threshold for feeding
- Separate contaminated grain and feed higher levels to finishing pigs or sell for cattle feed
- Binders – generally do not help with vomitoxin
  - Balance binder cost with other alternatives

Use synthetic amino acids continue to be used economically in finishing diets

Low Protein Amino Acid Price Calculator

	Price, $	
Corn	3.5	$/bu
Soybean meal	300	$/ton
L-Lysine	1.05	$/lb
DL-Methionine	2.2	$/lb
L-Threonine	1.6	$/lb

Savings per pig with AA fortified diet, $	$0.28

www.KSUswine.org

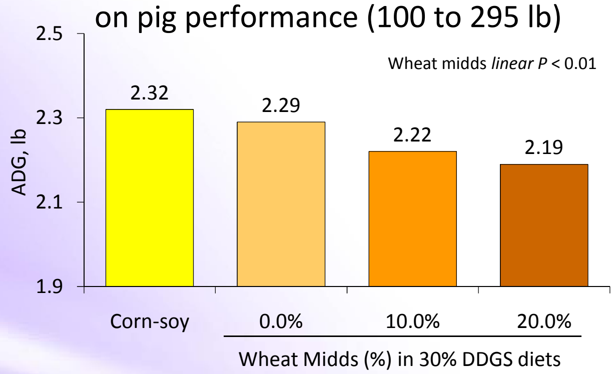
Sorghum vs corn

- 10 experiments before 1985 (Cromwell, 1985)
- 9 experiments after 1985 (Sulabo, 2010)

Sorghum value relative to corn

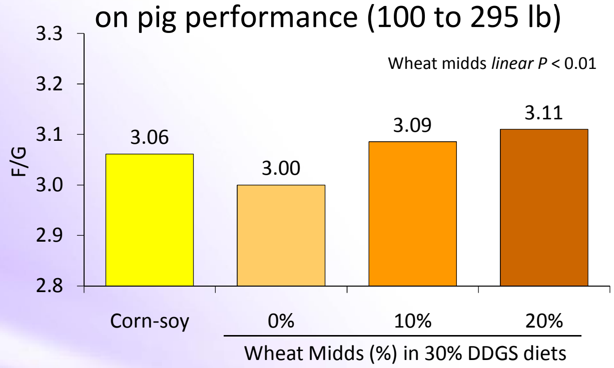
	Cromwell	Sulabo
ADG	98%	103%
ADFI	102%	106%
G/F	97%	98%

Effect of DDGS and wheat midds on pig performance (100 to 295 lb)

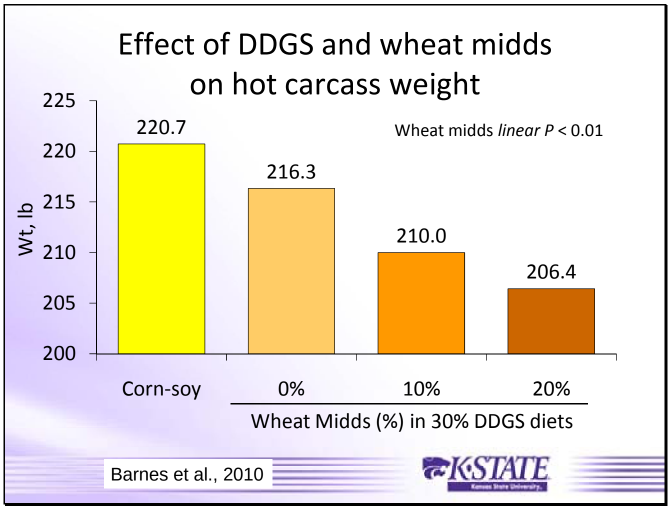


Barnes et al., 2010

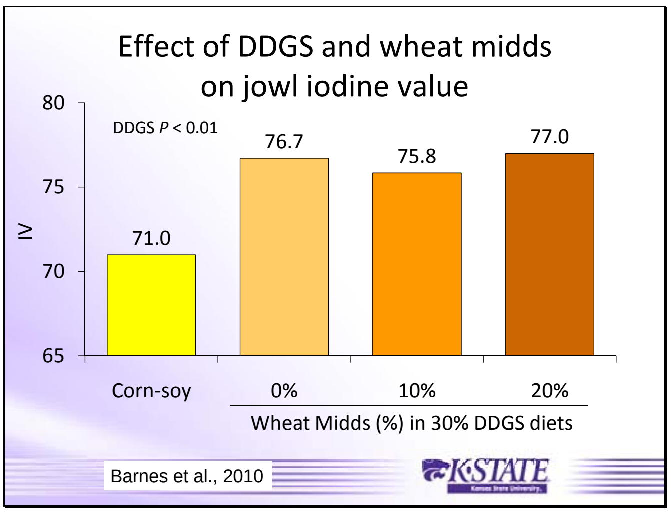
Effect of DDGS and wheat midds on pig performance (100 to 295 lb)



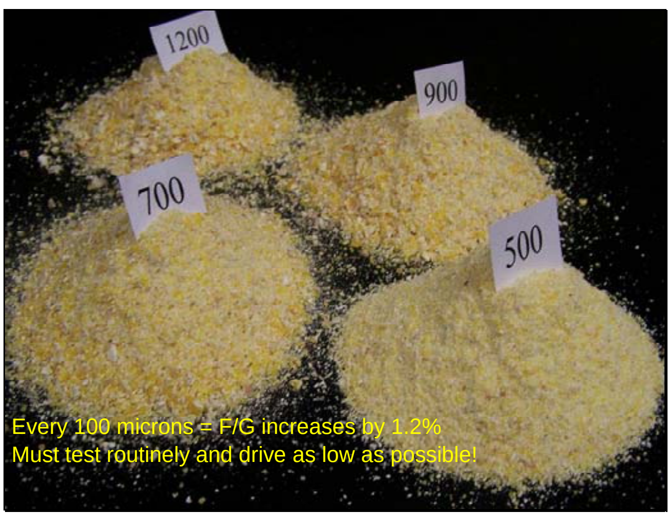
Barnes et al., 2010



Effect of DDGS and wheat midds
on hot carcass weight
Wt, lb
225
220
215
210
205
200
Wheat midds *linear* $P < 0.01$
220.7
216.3
210.0
206.4
Corn-soy
0%
10%
20%
Wheat Midds (%) in 30% DDGS diets
Barnes et al., 2010
K-STATE



Effect of DDGS and wheat midds
on jowl iodine value
IV
80
75
70
65
DDGS $P < 0.01$
71.0
76.7
75.8
77.0
Corn-soy
0%
10%
20%
Wheat Midds (%) in 30% DDGS diets
Barnes et al., 2010
K-STATE



1200
900
700
500
Every 100 microns = F/G increases by 1.2%
Must test routinely and drive as low as possible!

Do what we do well in Kansas

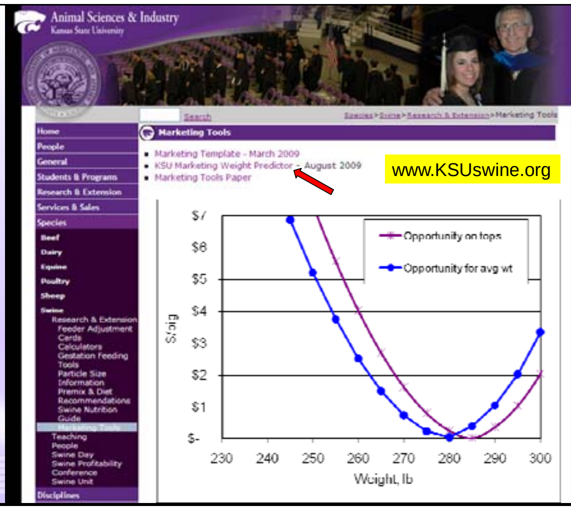
- Don't include ingredients that are not proven to be economically beneficial
  - Lots of products on the market, make sure there is solid data to back their use
- Aggressively control costs of all ingredients

Proper Finishing Feeder Adjustment

Marketing

- Optimal market weight (spreadsheets) – summer prices
  - Paylean, energy, ADFI (quality ingredients, health, etc), days to buy gain
- Pig removal (topping)
- Crush (spreadsheet?)

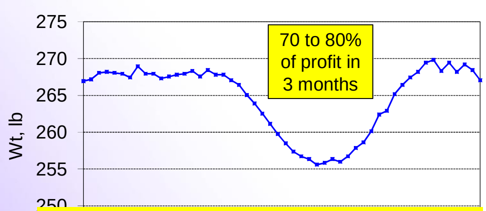
28



Optimal market weight for loads of pigs

Processor	$60/cwt; $160/ton	$70/cwt; $160/ton	$80/cwt $160/ton
Farmland	262 to 282	268 to 285	274 to 290
Excel	262 to 280	267 to 285	272 to 290
Tyson	268 to 295	275 to 300	> 285
Triumph	> 280 (300)	> 280 (320)	> 280 (330)

Seasonal Influence on Market Weight

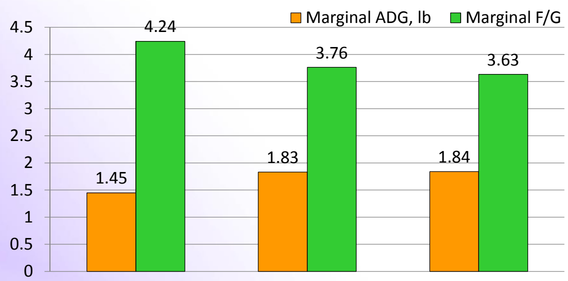


Buying gain:

- Paylean, energy, ADFI
- DAYS (need 7 to 10 d more in summer)

Pig removals

Impact of pen unloading on feed efficiency and average daily gain



Pigs/Pen	24	24	24
Pigs Removed	0	6	12
Pig space, sq ft	7.25	9.67	14.50

Boyd et al., 2008

Impact of pen unloading on feed efficiency and average daily gain

Pigs/Pen	25	25	25
Pigs Removed	0	2	4
Space/pig (square feet)	7.2	7.8	8.6
Pen Start Weight, lb	241	242	242
Residual Weight, lb	241	239	237
Final Weight (lb)	275	277	276
Removed lb	0	544	1,068
Removed Ave Weight	0	272	267
Marginal Days on Feed	15	15	15
Marginal ADG, lb	2.26	2.52	2.58
Marginal F/G	2.81	2.67	2.52
Total lb/pen	6,876	6,911	6,855
Low Rev-HighFeed, $/pen	2,786	2,807	2,817
High Rev-LowFeed, $/pen	3,885	3,912	3,906

Jacela, 2008

Impact of pen unloading on feed efficiency and average daily gain

Pigs/Pen	25	25	25	25	25
Removed –d 0	0	2	2	2	2
Removed – d 10	0	0	2	4	6
Space/pig (sq ft)	7.2	7.8	8.6	9.5	10.6
ADG, lb	2.02	2.23	2.30	2.34	2.44
ADFI, lb	5.82	6.04	6.27	6.44	6.44
F/G	2.88	2.71	2.73	2.75	2.64
Total pen gain, lb	1,010	1,027	1,012	983	975
Total pen feed, lb	2,910	2,780	2,757	2,703	2,575

Jacela, 2008

Marketing strategy – Barn messages

- Get the heavy pigs on the first load!
  - Pigs over 340 lb "fall off the cliff" in terms of penalty.
  - Pull pigs from ALL pens when topping
    - Increases growth of other pigs in pen
    - Avoids problems of only pulling pigs near the door
    - Don't sort by weight when filling barns
- Hold lightest pigs for last cleanout load
  - A surprising number of lighter pigs make it onto the initial load from a barn.

Marketing strategy - Management messages

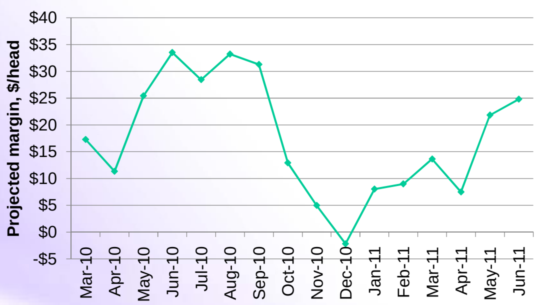
- Minimize age spread within a barn to minimize variation
- Determine optimal weight for your market
  - Understand impact of market price and feed cost on optimal weight
- Top barns aggressively when weight bypasses optimum
  - Low market price, winter
- Less topping when weights are below optimum
  - High market price, summer

Marketing plan

- Not our area of expertise!
- Must know your costs
- Monitor Crush
- Work with multiple experts
- Make a plan!

Crush spreadsheet example

..\Data\Crush margin example.xlsx



Needed for low cost and optimal margin

- Productivity
  - reproduction x genetics x health
- Health
- Pig care
- Feed cost (F/G x ingredient purchase)
- Marketing (weight x plan)

Thank You!

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Kansas State University
Research and Extension

….Notes…..Notes…..Notes…..Notes

SWINE PROFITABILITY CONFERENCE

February 2, 2010

"Sow Production: Where We've Been, Where We're Going"

by
Steve Dritz
Kansas State University

Sow production:
Where We've Been, Where We're Going

Steve S. Dritz, DVM PhD
Kansas State University

The productivity of the sow herd is certainly a key driver of profitability in pork production. Industry level sow productivity has been on an upward march for several decades in the US. For example pork production was over 5 times greater last year compared to 1930 while the size of the sow herd was less than half.[1] Also, this productivity growth has accelerated from a growth of 2% per year prior to 1980 to 2.8% per year from 1980 to present.

Table 1. Components of US sow herd productivity growth.

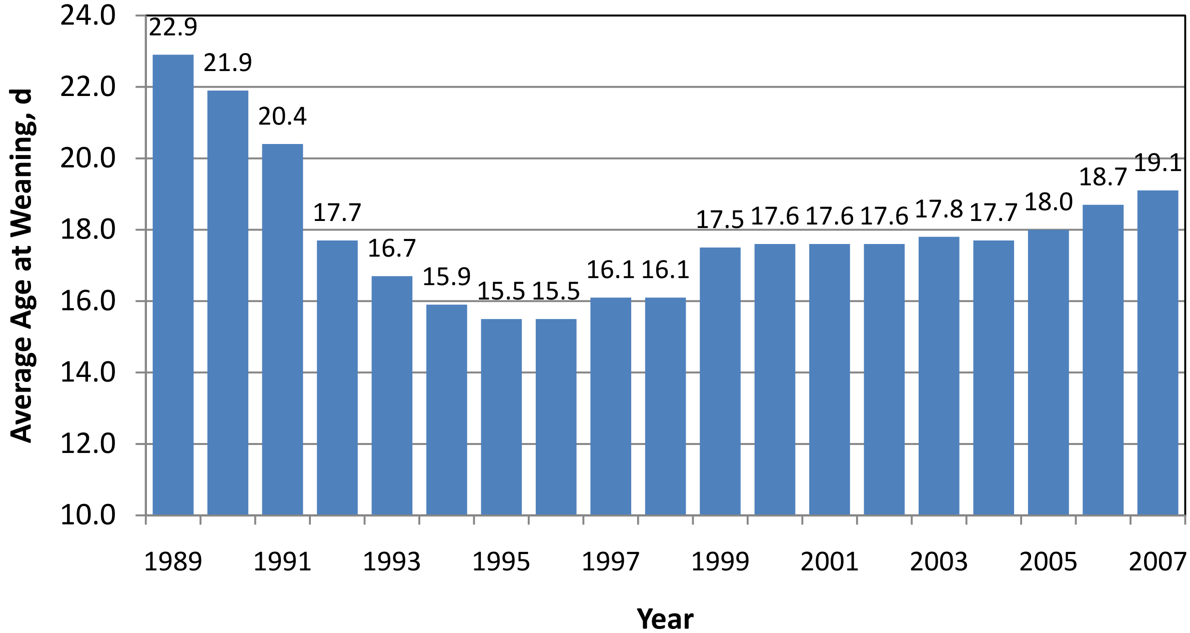
Item	1930-80	1980-06
Litters/sow/year	0.5%	1.1%
Pigs/litter	0.4%	0.9%
Livability	0.5%	-0.1%
Slaughter weight	0.6%	0.6%
Trade impact	0.0%	0.3%
Total	2.0%	2.8%

Adapated from data provided by Dr. Ron Plain, University of Missouri.

Note that the acceleration of productivity growth has been the result of an increase in productivity from two main factors: pigs per litter and litters per sow. The productivity for these two factors have doubled while livability productivity has decreased and slaughter weight remained static. Since pigs per liter and litters per sow per year are the two major components of pigs per sow per year, this indicates that the relative rate of change in sow productivity has been the result of improvements in pigs per sow per year relative to the other factors.

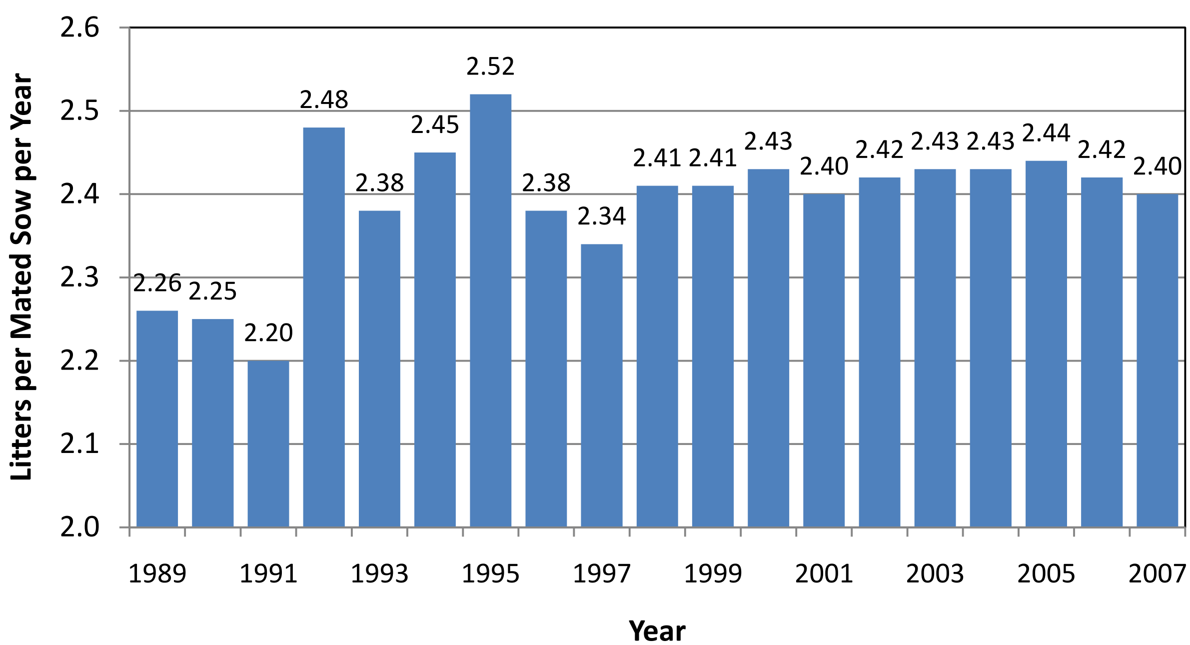
How has productivity changed overtime within a production system? The longest continuous data base available for our analysis extends back to 1989 with yearly data through 2007. The total number of farms was 30 in 1990 with an average herd size of 190 sows. In contrast, the data from 2007 consists of 64 farms with an average herd size of 2,375 sows. This data represents a transition from primarily farrow to finish farms at the beginning of the period to multi site farrow to wean sow farms. This transition is evident in a plot of weaning age (Figure 1). Average weaning age declined from 23.9 d to 15.5 days. Gradually, as the importance of increasing weaning age on finishing performance has been recognized the average age has risen to 19.1 d.

Figure 1. Changes in average weaning age from one US swine production system.



With the transition to earlier weaning ages, there was an increase in litter per sow per year (Figure 2). However, subsequently litters per sow have remained relatively constant at approximately 2.4 for a large portion of the time period. Interestingly, if the industry wide 1.1% improvement in litters per sow per year were to continue in these herds their litters per sow per year would be greater than the biological maximum of 2.6 litters per sow (115 d of gestation + 20 d lactation + 5 d Wean to Service)/365=2.61). Thus, future sow productivity improvements will have to be derived from litter size and livability improvements. Also, this seems to indicate that the industry wide improvements have been as a result of attrition of poorly managed farms in contrast to consistent improvement within farms for litter size.

Figure 2. Changes in litters per sow per year from one US swine production system.



Pigs born alive per litter increased rapidly in the transition from farrow to finisher herds (Figure 3). It appears that this was probably due to implementation of maternal line sows with increased heterosis. Then there is a relatively stable period with fluctuations around an average of 10.1 pigs per litter. However, over the last four years there appears to be a significant change with a dramatic improvement in live born litter size. Certainly, improvements in live born litter size can be lost with off-setting increases in prewean mortality. Note that prewean mortality has trended lower over time (Figure 4). Also, it is encouraging that the increase in live born litter size over the last four years has been accompanied by minimal increases in prewean mortality. The increase in live born litter size and trend downward in prewean mortality over time has resulted in an increase in pigs weaned per sow per year (Figure 5). Certainly while pigs per sow per year is a key driver we need to keep in mind that quality of weaned pigs as exhibited by their post weaning performance needs to be taken into account when measuring sow farm productivity. Another encouraging trend within this production system is the recent improvement in sow mortality (Figure 6). After rapidly increasing in the 1990's, sow mortality has been consistently decreasing in recent years.

Figure 3. Changes in live born litter size from one US swine production system.

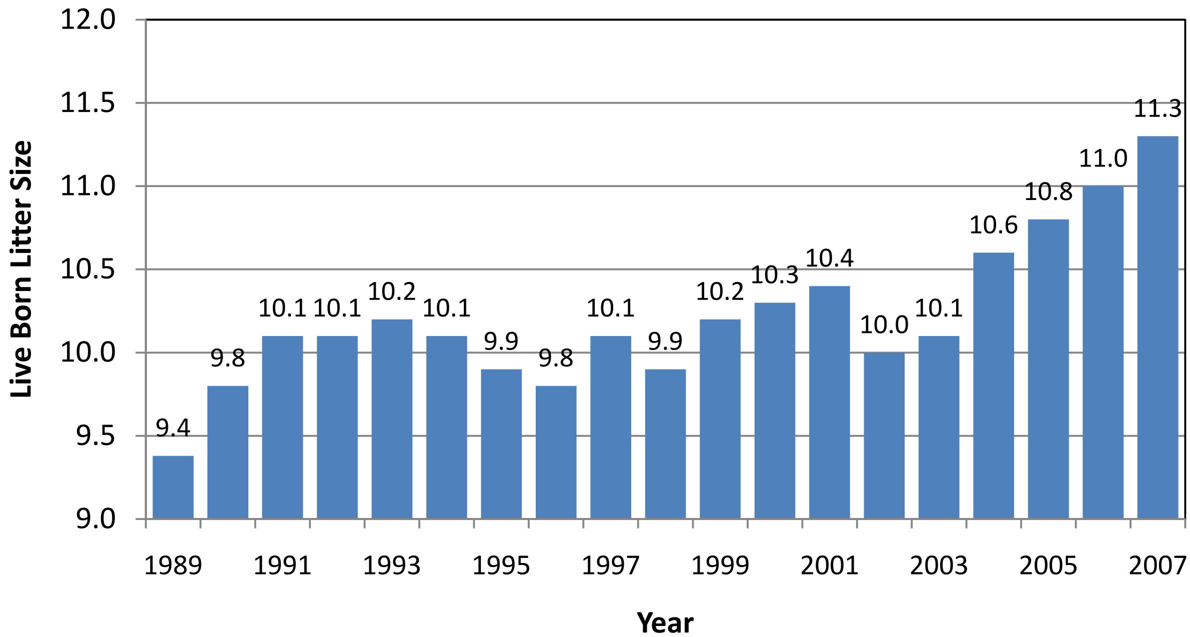


Figure 4. Changes in prewean mortality from one US swine production system.

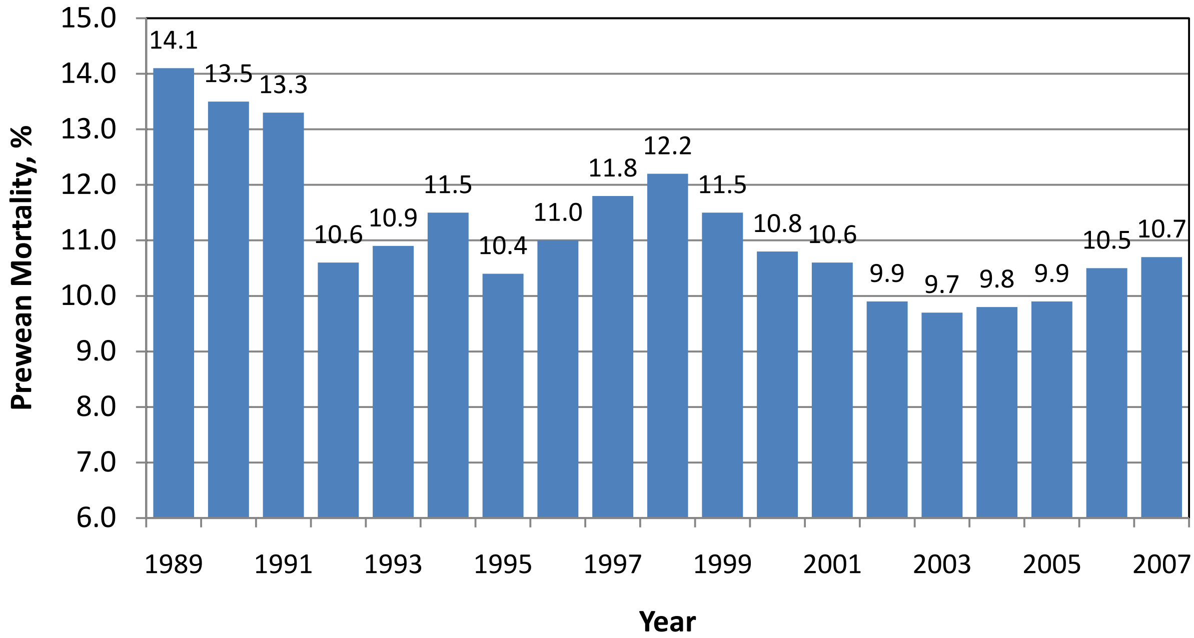


Figure 5. Changes in pigs weaned per mated female from one US swine production system.

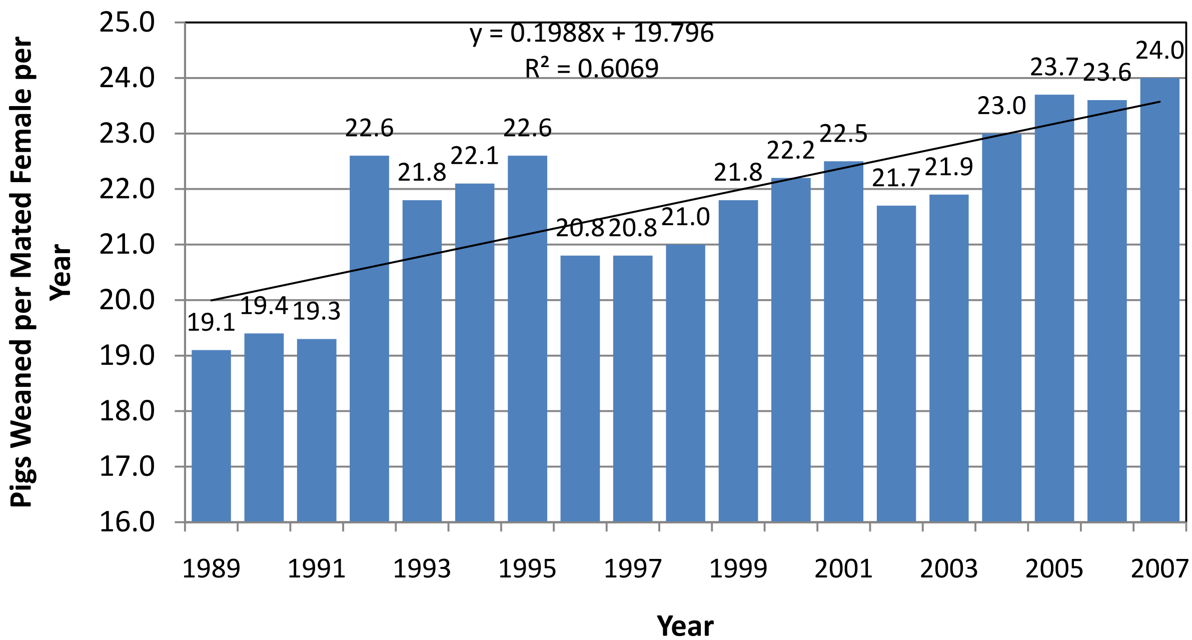
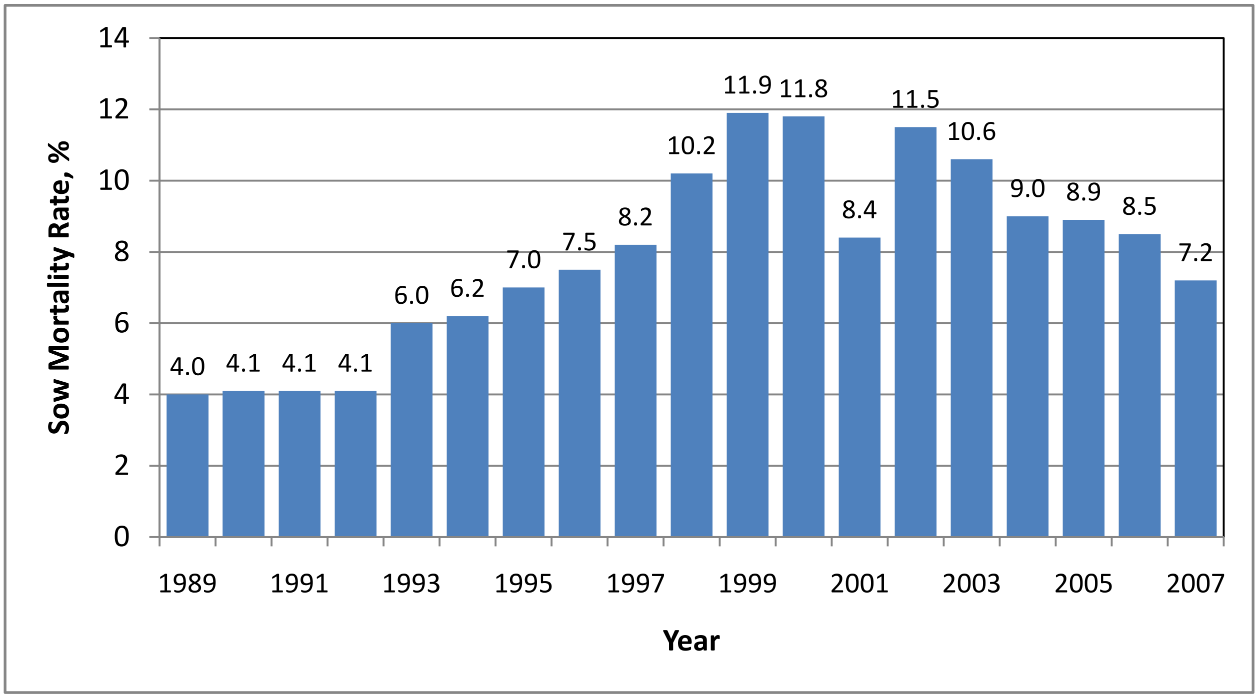


Figure 6. Changes in sow mortality rate from one US swine production system.



The volatility in feed costs over the last two years has forced us to reexamine all aspects of in our nutritional programs. During this exercise, one thing we have had to relearn is the importance in the sow herd that productivity is a key driver for lowering weaned pig feed costs. For example in one analysis conducted recently for our Kansas producers indicates that the relative range from using different ingredients such as milo or dried distillers grains was projected to reduce gestation feed cost about $0.65 per weaned. However, in the same analysis we projected increasing productivity from 20 to 22.5 pigs weaned per inventoried sow would decrease weaned pig feed cost by $1.10 per weaned pigs. Certainly, we want to capture both opportunities but it illustrates that an increase in 2.5 pigs weaned per sow is over 1.5 times greater than the impact of changing ingredient economics.

Another area of opportunity that we have spent little time characterizing is gilt development feed costs. For example with the recent increases in feed ingredient prices the feed cost per gilt in a 60 day isolation period can exceed $50 per gilt. Conversely, delaying the age at first mating by 30 days can increase feed cost by $25 per gilt or $.50 or more per weaned pig. Challenges in characterizing gilt development costs occur many time since gilts are developed in continuous flow facilities. An additional area of opportunity to increase financial productivity of the sow herd is to increase pigs weaned per lifetime per sow. Not only will this decrease genetic costs but it will decrease gilt development feed cost per weaned pig produced. For example if total feed cost for developing a gilt to their first breeding is $90 then increasing their lifetime productivity from 35 pigs to 50 pigs will reduce gilt development feed cost by over $0.90 per weaned pig.

As an aggregate, the US swine industry continues a relentless increase in productivity. Over long periods of time the productivity incremental gains of 2 to 3% per year result in significant gains in productivity. Also, sow farm productivity is a key driver for reducing costs such as feed costs. Opportunities for biologic improvement will revolve around increases in litter size that result in an increased number of pigs sold with increased productivity. Additionally, there appears to be significant opportunities in improving financial productivity from creatively capturing and monitoring costs or parameters that have not been traditional indicators of sow farm productivity. Examples include gilt development feed cost per weaned pig and the impact of lifetime productivity on feed costs.

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SWINE PROFITABILITY CONFERENCE

February 2, 2010

"Rachitic Rosaries and Rib Nodules"

by
Steve S. Dritz and Jerome C. Nietfield
Kansas State University

Rachitic Rosaries and Rib Nodules

Steve S. Dritz, DVM PhD and Jerome C. Nietfeld, DVM PhD Diplomat ACVP
Kansas State University

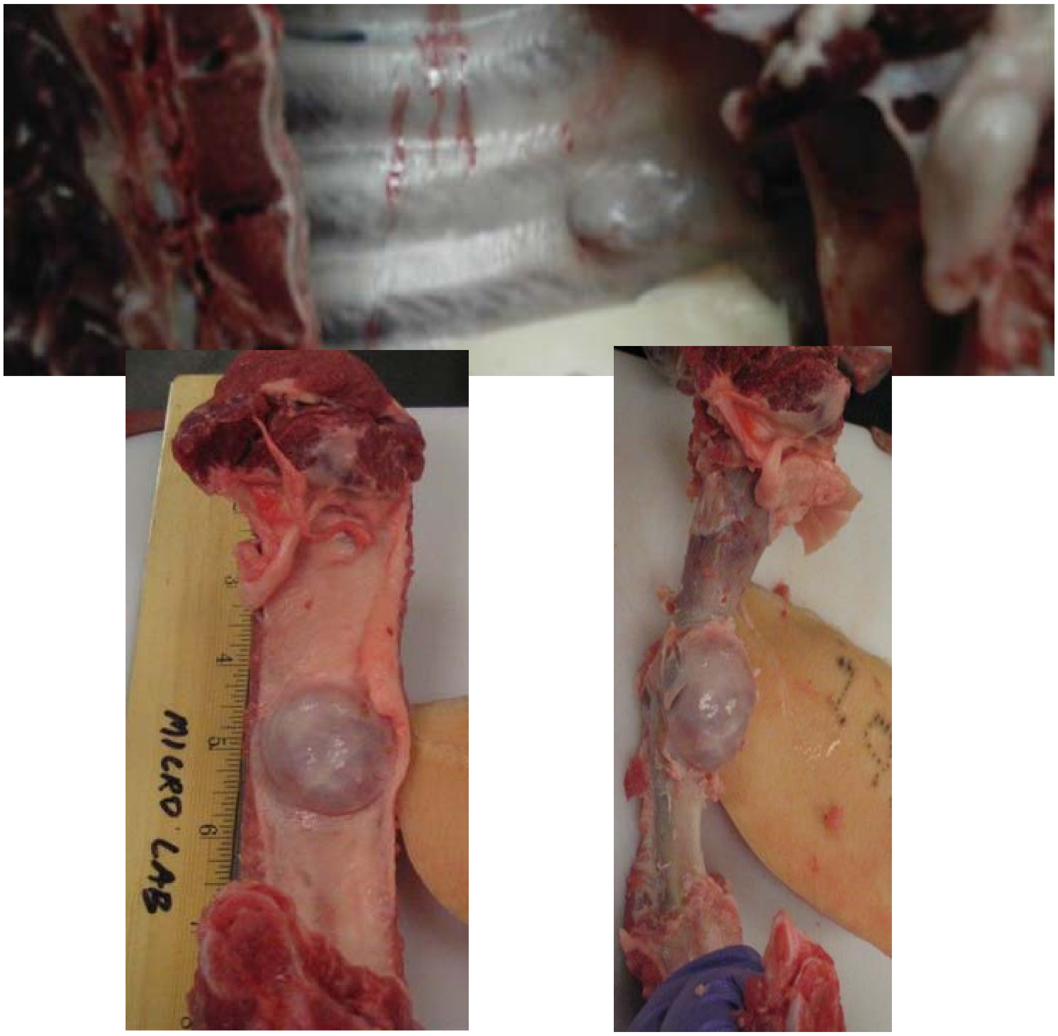
Nutrition problems associated with calcium and phosphorus metabolism is the most common metabolic nutritional disease we encounter. Typically, these problems are associated with gross errors in diet formulation or feed manufacturing. For example, cases we have encountered include lack of vitamin D included in the vitamin premix, erosion of a hole in the salt storage bin into the monocalcium phosphate bin, and lack of providing supplemental inorganic phosphorus when switching from a base mix to a premix program. Also, we have encountered vertebral breakage associated with stunning that did not appear to affect production parameters and appeared to have been caused by feeding a withdrawal diet lacking an inorganic phosphorus source (Dritz et al., 2000).
Recently, the higher cost of vitamins and inorganic phosphorus sources has lead to lowering of nutrient margins of safety in many swine diet formulations. Also, this has driven the use of higher levels of the supplemental enzyme phytase in diets to increase the availability of phosphorus. With the use of dried distiller's grains and phytase, many grow finish diets currently lack supplemental inorganic phosphorus supplementation. Since phytase is an enzyme, it is susceptible to inactivation and degradation overtime if exposed environmental conditions such as heat and humidity during extended storage times. Finally, due to the expression of phytase activities that vary across sources there is a greater potential of errors in premix or diet formulation. Therefore, the risk of calcium and phosphorus nutritional disorders has increased in the past few years.

Case Description

This case is based on an email provided to us that was sent to all producers supplying pigs to a US packing plant. Excerpt from the email:

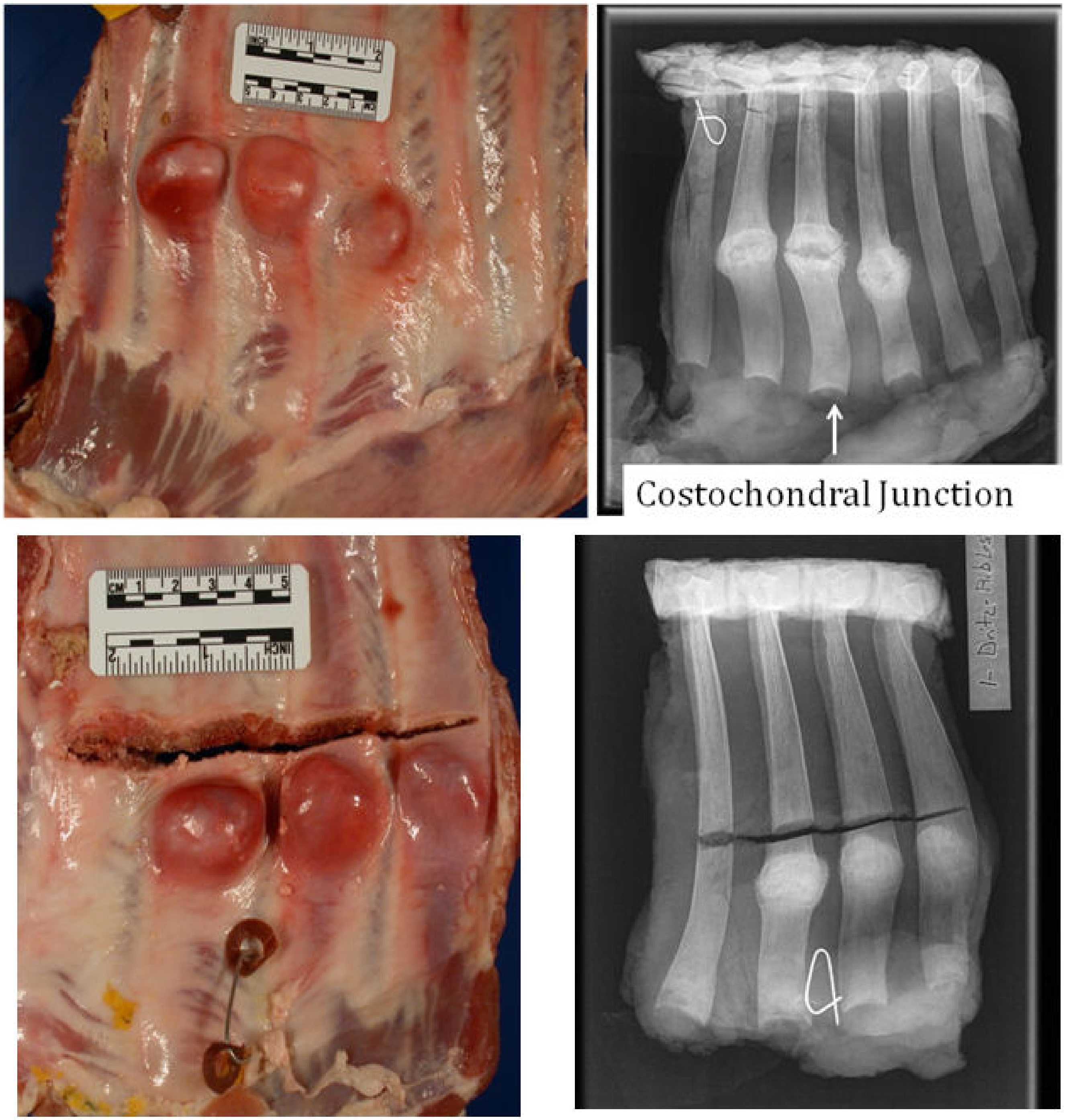
> Subject: Rachitic Rosaries (Rib Nodules) & Nutrient Deficiencies
> ……. *We have several carcasses everyday with rachitic rosaries, which are abnormal nodules that occur on the rib bones when moderate deficiencies of calcium, phosphorous and vitamin D3 occur in the diets. Pictures are attached that show these rachitic rosaries (rib nodules).*
> *This past week we have been monitoring carcasses with rachitic rosaries ….*
> *Rachitic rosaries are indicative of decreases in growth rates and feed conversion, and they also result in a substantial loss in carcass value due to the damage that occurs to the ribs and belly when these rib bone nodules are removed.*
> *Check the formulation of your swine diets to make sure that adequate levels of calcium, phosphorus and vitamin D3 are present in all diet phases….*

Pictures provided with the email message:



Since we were unfamiliar with the term rachitic rosaries, we did a brief literature search and found that the term is a description of rickets lesion from the human literature. The term is based on a clinical presentation of multiple enlarged ends of the ribs at the costochondral junction (Nield et al., 2006). Thus, the enlarged ends provide a beaded (rosary) type appearance of the costochondral junction on palpation or radiographs.

A brief review of the pathology of rickets indicated that rickets is a disorder of the developing skeleton with macroscopic lesions most prominent at sights of rapid growth, especially the growth plates of long bones and costochondral junctions of the large middle ribs (Maxie, 2007). These lesions form as a result of defective mineralization of cartilage matrix at the growth plates and in newly formed osteoid. The cartilage matrix continues to proliferate with the lack of mineralization and leading to the beaded nodular appearance. This reference indicated that the lesions are best appreciated on radiographs and that lesions may vary considerably within the same animal. Therefore, since we were unable to discern if the costochondral junction was involved, we requested samples from several carcasses be sent to the KSU Veterinary Diagnostic Laboratory. A radiographic, gross and histopathologic evaluation of these samples was performed.

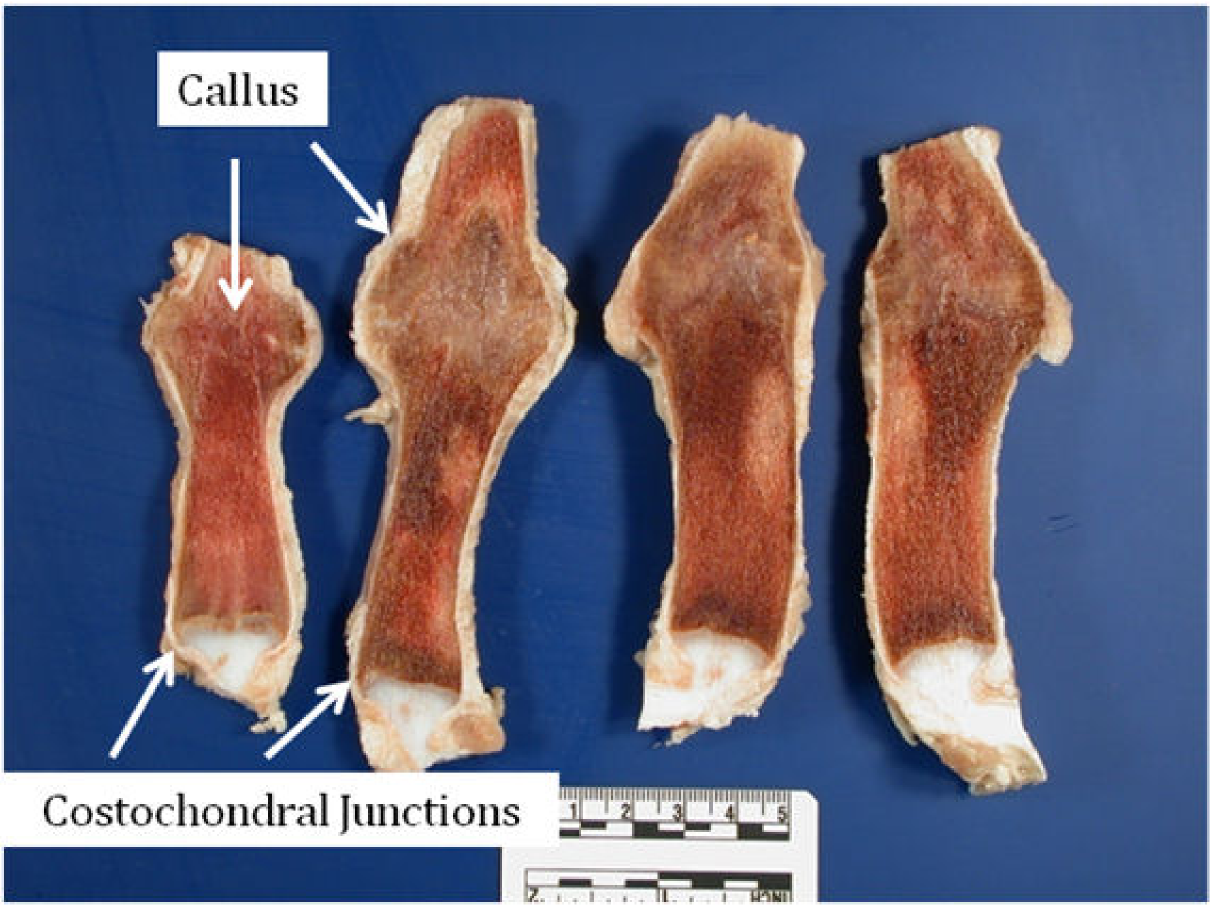


Gross and radiographic evaluation of representative rib samples from pigs with rib nodules.

KSU Radiologist Comments:

Note that all lesions are mid shaft, suggestive of compressive forces causing a fracture. Additionally, there is no evidence that these lesions are infected or any kind of infective process associated with them. All of these lesions are suggestive of bony callus formation associated with fracture healing. Especially, with poor stability of the fracture, the callus size will be increased. Finally, bone density appears normal and there is even some evidence of calcification in the cartilaginous portion of the ribs. Metabolic disease associated with diet would be expected to be more diffusely distributed.

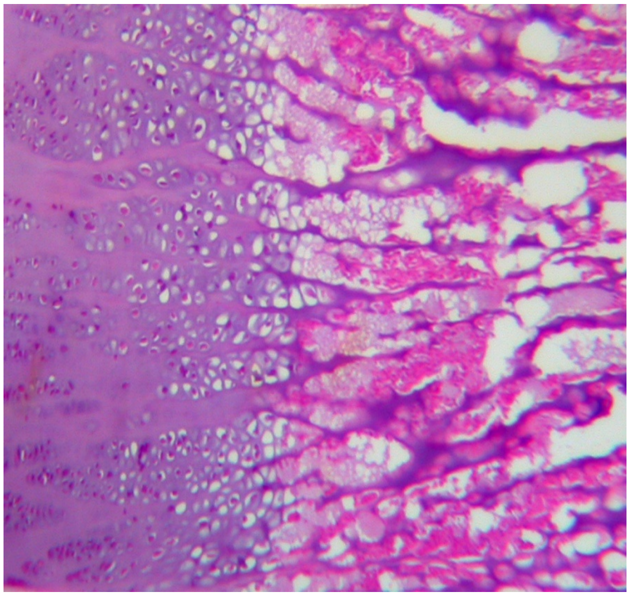
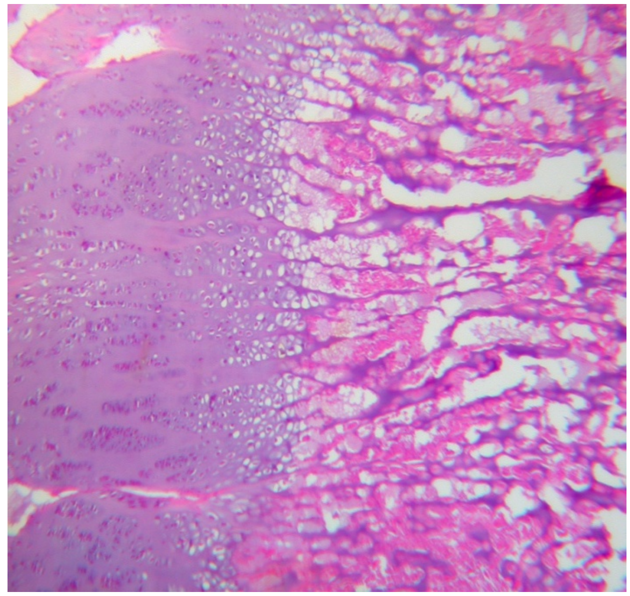
Next, several ribs were dissected and split using a band saw, with care taken to include the nodular lesions and the costochondral junction.



As indicated, none of the bony nodules are associated with the costochondral junction. Also, there is a clear demarcation of the mineralization zone for the cartilaginous matrix at the growth plate. Finally, in agreement with radiographic evaluation, the cortical bone thickness appears normal.

Microscopic evaluation:

Sections of costochondral junction consist of normal cartilage that gives rise to bony spicules that form the primary spongiosa adjacent to the growth plate. The primary spongiosa is normally remodeled and the secondary spongiosa is formed normally. In the cartilage portion of the costochondral junction, the resting chondrocytes give rise to proliferating chondrocytes which become arranged into rows that progress and mature as they progress towards the costochondral junction. The mature chondrocytes then become normally mineralized to form the primary spongiosa.

The nodules involving the ossified portion of the bone contain areas where the continuity of the bone spicules is disrupted and fibrous connective tissue fills the space between the bone spicules. The fibrous tissue and the bone on either side of the fibrous tissue are disorganized and sometimes contain small nodules of disorganized cartilage. These areas represent calluses and are the result of a previous fracture that is in the process of healing.

Due to the lack of costochondral junction involvement and microscopic indications of normal growth plate development at the costochondral junction our assessment was that these nodules are not associated with rickets. We believe a likely cause is a traumatic event a number of weeks prior to slaughter is responsible for these lesions. Although, we cannot fully rule out a marginal calcium or phosphorus deficiency that may have lead to osteoporosis and bone weakness during a prior period of growth. In marginal cases of deficiency, bones or areas that consist predominately of cancellous bone, rather than trabecular bone are first affected. Thus, the first signs are often seen in vertebrae, ribs, and other flat bones. Due to the preferential mobilization from specific bones serving as a reservoir to mitigate these marginal deficiencies, they may not have an impact on production parameters similar to the case we have observed previously with the vertebral fractures.

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SWINE PROFITABILITY CONFERENCE

February 2, 2010

"Iodine Value and Impact on Pork Quality: What is Iodine Value and Why Should We Be Concerned?"

by

Joel DeRouchey, Mike Tokach, Steve Dritz,

Bob Goodband, and Jim Nelssen

Kansas State University Swine Team

Iodine Value and Impact on Pork Quality: What is Iodine Value and Why Should We Be Concerned?

Joel DeRouchey, Mike Tokach, Steve Dritz, Bob Goodband, and Jim Nelssen
Kansas State University

Introduction

The term "Pork Quality" is used in a very general sense when describing various attributes of a pig carcass. Historically, loin pH and sensory traits, drip loss, and color scores have been most widely used to describe "Pork Quality." At the same time, fat depot composition and color received less emphasis compared to loin attributes. More recently however, processors have put more emphasis on carcass fat quality as a measure of "Pork Quality." Some of the reasons for this include export market acceptance which require ideal color and firmness, fresh pork shelf life, and the slice ability of bellies for bacon, which are affected negatively if the carcass fat becomes too unsaturated or "soft." In order to quantify "Pork Quality" as it relates to carcass fat composition, researchers and processors have focused on determining the iodine value of carcass fat.

What is iodine value?

Iodine value is a measurement to estimate the amount of unsaturation present in the fatty acids present in carcass fat. Since unsaturated fatty acids are "softer" or less firm, iodine value can be used as indicator of overall carcass fat firmness. Iodine value can be measured by three different methods. First, direct laboratory analysis that involves iodine binding to unsaturated or double bonds in fatty acids; thus a greater amount of iodine will bind to a sample that has a greater proportion of unsaturated fatty acids (AOCS, 1998). This process is the true chemical analysis procedure for determining iodine value. However, due to the skill and time required to complete the lab analysis, this procedure has not been widely used. The results of iodine value are reported on a g / 100 g basis, with a lower value indicating a more saturated fatty acid composition, which is considered more ideal. Second, iodine value can be calculated from a fatty acid analysis where iodine value = [C16:1] × 0.95 + [C18:1] × 0.86 + [C18:2] × 1.732 + [C18:3] × 2.616 + [C20:1] × 0.785 + [C22:1] × 0.723, where the brackets indicate concentration (percentage) of the fatty acid (AOCS, 1998). This approach has been widely used by researchers to determine carcass fat iodine and can be done easily after the fatty acid composition has been determined for a fat depot. Finally, n*ear-infrared analysis* **(***NIR***)** can be used to determine iodine value. Some processors are utilizing this method as it is the most rapid method for determining iodine value results. However, the precise calibration of the NIR machine is essential to accurately determine the iodine value of the carcass fat sampled.

What is an acceptable carcass fat iodine value?

A limited amount of research has indicated that the maximum acceptable iodine value should be 70 g/100 g (Barton-Gade, 1987; Madsen et al., 1992) or 75 g/100 g (Boyd et al., 1997). The true concern of swine processors regarding “softer” carcasses do vary in the United States which impacts the ideal iodine value for different producers. Currently, some packing plants have set their maximum iodine value at 73 g/100 g. Other plants do not specify a maximum iodine value; rather have specific recommendations for maximum use of certain ingredients, such as a maximum DDGS in late finishing diets. Thus, dietary strategies that different producers can utilize will vary depending on the processing plant pigs are marketed.

How can carcass fat iodine value be altered?

When fatty acids are absorbed from the diet, especially polyunsaturated fatty acids, they specifically inhibit endogenous synthesis of fatty acids. This effect then inflates the effect of dietary fat composition influencing body fat composition. Therefore, it is possible to manipulate the composition of body fat quite dramatically by selection of dietary fats (Pettigrew and Esnaola, 2001). Because most common dietary fats are more unsaturated than the triglycerides the pig synthesizes endogenously, this can also lead to increased softness of carcass fat.

It is well documented that carcass fat composition is affected by the dietary ingredients and the composition of fatty acids that are fed (Averette Gatlin et al., 2002; Benz, 2008; Apple et al., 2009). Formulating diets that contain more unsaturated fat from fat sources, such as soy oil, yellow grease or animal-vegetable blends or from ingredients such as DDGS, bakery, or full fat soybean meal, will increase the unsaturation of the carcass fat. When carcass fat becomes more unsaturated, it becomes more flexible and termed “softer.” Also, feeding more saturated fat sources, such as choice white grease will also increase iodine value, but at a much smaller degree.

In the review of feeding DDGS to swine, Stein and Shurson (2009) summarized data from 8 trials that evaluated carcass fat iodine value, in which 7 trials showed an increase in iodine value and 1 trial reported no change in iodine value. As a rule of thumb based on available data, carcass fat iodine value increases 2 g /100 g for every 10% DDGS that is fed throughout finishing. Thus, if the baseline of a herd fed a corn-soybean meal based diet has an iodine value of 66 g/100 g, pigs fed 30% DDGS would have an estimated carcass fat iodine value of 72 g/ 100 g.

Also, to determine the effect of different added fat sources, Benz (2008) fed pigs either a control corn-soybean meal diet, or diets with 5% choice white grease or soybean oil from 97 to 285 lb, and reported jowl fat iodine values of 63.3, 68.8, and 84.3 g/100 g, respectively. Apple et al. (2009) evaluated feeding a control diet, or diets with 5% tallow, poultry fat or soybean oil from 62 to 250 lb. They reported carcass iodine values of 65.2, 64.7, 69.0, and 78.8 g/100 g, respectively. These data further demonstrate the impact of dietary fat source and its impact on carcass fatty acid composition.

Research has also shown that cereal grain type can alter the carcass iodine value. Lampe et al. (2006) reported that pigs fed barley had reduced iodine values compared to pigs fed corn (58.7 vs. 61.8). Furthermore, Benz (2008) reported that pigs fed milo had reduced carcass fat iodine values then pigs fed corn (68.3 vs. 70.3 g/100 g). Pigs fed Paylean at 9 g/ton 35 d prior to slaughter have been shown to have increased backfat iodine value than pigs not fed Paylean (Apple et al., 2009; 75.5 vs. 72.7 g/ 100 g). However, Duttlinger et al. (2009) reported that pigs fed Paylean at 6.75 g/ton for 28 d prior to slaughter did not have different backfat iodine values than pigs not fed Paylean (68.4 vs. 68.1 g/100 g). Reasons for this conflict of data may be due to higher feeding levels and longer durations by Apple et al. (2009) compared to Duttlinger et al. (2009).

Does iodine value change based on fat depot location on the carcass?

The iodine value of carcass fat does change by depot location. Benz (2008) reported in three separate experiments that jowl fat was 4.5, 1.1 and 2.4 g/ 100 g higher than found in backfat. Thus, location of where the fat depot is selected for analysis can influence the iodine value reported. Currently, most packers are utilizing fat form the jowl as the point of measurement due to ease of collection and prevention of loin damage from trimming backfat.

What factors other than dietary composition affect the iodine value?

Research evaluating gender differences has been inconsistent in demonstrating differences in iodine value. Benz (2008) reported in two studies that gilts had a 1.5 and 0.7 g/ 100 g increase in carcass iodine value in jowl fat compared to barrows, but in a third study found that gilts had a decreased jowl iodine value of 0.40 g /100 g compared to contemporary barrows.

While no data is available on pig health status, fields observations have reported that health challenged pigs will have higher iodine values than contemporary healthy pigs. The mechanism for this observation effect is unknown and needs research to determine the true effect of health on final carcass iodine value.

Can iodine values be predicted by dietray compositon?

Madsen (1992) and Boyd et al. (1997) developed equations to predict backfat iodine from calculating a dietary iodine value product (IVP). Iodine value product is calculated as: (IV of the dietary lipids) $\times$ (percentage dietary lipid) $\times$ 0.10. However, Benz (2008) was unable to validate the dietary iodine value product with the actual carcass iodine values when using these equations when they fed various diets that were formulated with different fat and ingredient sources in combination. More research needs to be completed to accurately predict dietary feeding levels and duration of feeding various ingredients to predict final carcass fat iodine value.

However, nutritionists are becoming more comfortable with setting ingredient levels to match the required carcass fat iodine value. The key to predicting the iodine value accurately is having the actual farm baseline fed known diets throughout finishing and the resulting carcass fat iodine value. Once this is known, changes to dietary ingredients can be used to alter the value with some degree of confidence.

Summary

Iodine value is an indirect measure of carcass fat firmness and is directly impacted by the level of unsaturated fatty acids in the diet. More research is needed to accurately predict carcass iodine value when using various dietary ingredients containing different levels of saturated and unsaturated fatty acids. Also, depending on specific packer specifications, some producers must monitor carcass iodine values, while others who market to processors who do not measure or monitor iodine values are not impacted.

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