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"Information for an industry on the move!"

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MORE PIGS ON THE WAY!

By: Dr. Steve Meyer, Ph.D.

National Pork Producers Council, Des Moines, IA

JUNE HOGS AND PIGS REPORT.

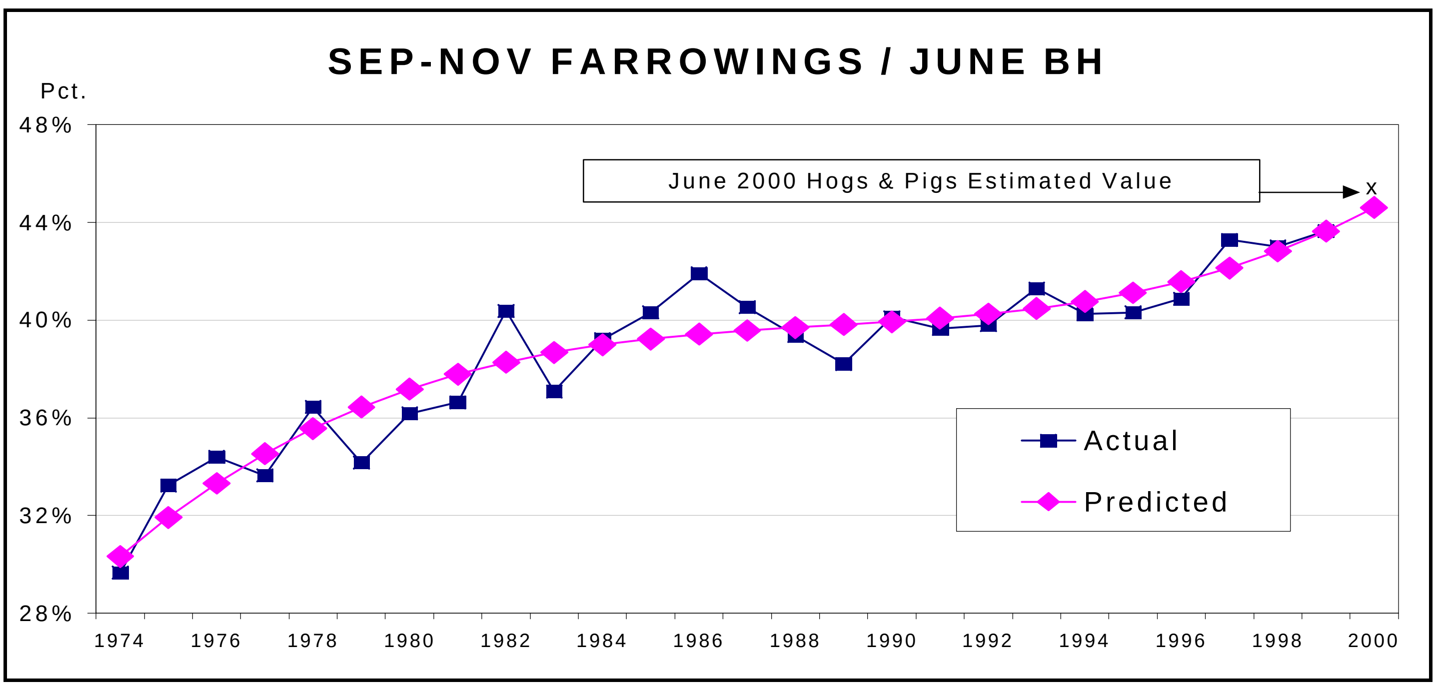
USDA's June Hogs and Pigs report showed slowing declines in both the market and breeding herds. Comparing slaughter since June 1 to the report numbers leaves no reason to question its validity at this point. The biggest question posed by the report is "Can we get 1% more litters this fall out of 4% fewer sows?" It's not out of the question! The graph at right shows the historical data for the percent of the June breeding herd that farrows in the Sep-Nov quarter. The time trend explains 90 percent of the historical variation -- and has been very accurate since 1990! The forecast from this year's June report is above the trend line by almost the same amount as in 1993 and 1997 -- and remember what happened 12 months later then!

AND WHAT IF WE GET THAT MANY LITTERS THIS FALL?

Hog slaughter will rise to above year-earlier levels in March 2001 and, in the absence of continued strong retail demand and squeezed margins, result in lower hog prices than in 2000 beginning in the second quarter of 2001. If the breeding herd begins to grow this fall, look for marked increases in slaughter in the second half of 2001 and correspondingly much lower hog prices.

WHAT ARE THE ODDS OF BREEDING HERD GROWTH?

Very good. The corn and soybean meal to make a ton of 16% crude protein diet can be purchased today, August 4, for $83.32 in the December futures assuming NO BASIS ($1.90 corn and $147.50 meal). That kind of feed price will put many producers below $35/cwt. on costs and some below $30/cwt. Feed price risk is no longer limiting breeding herd growth.



What's inside...

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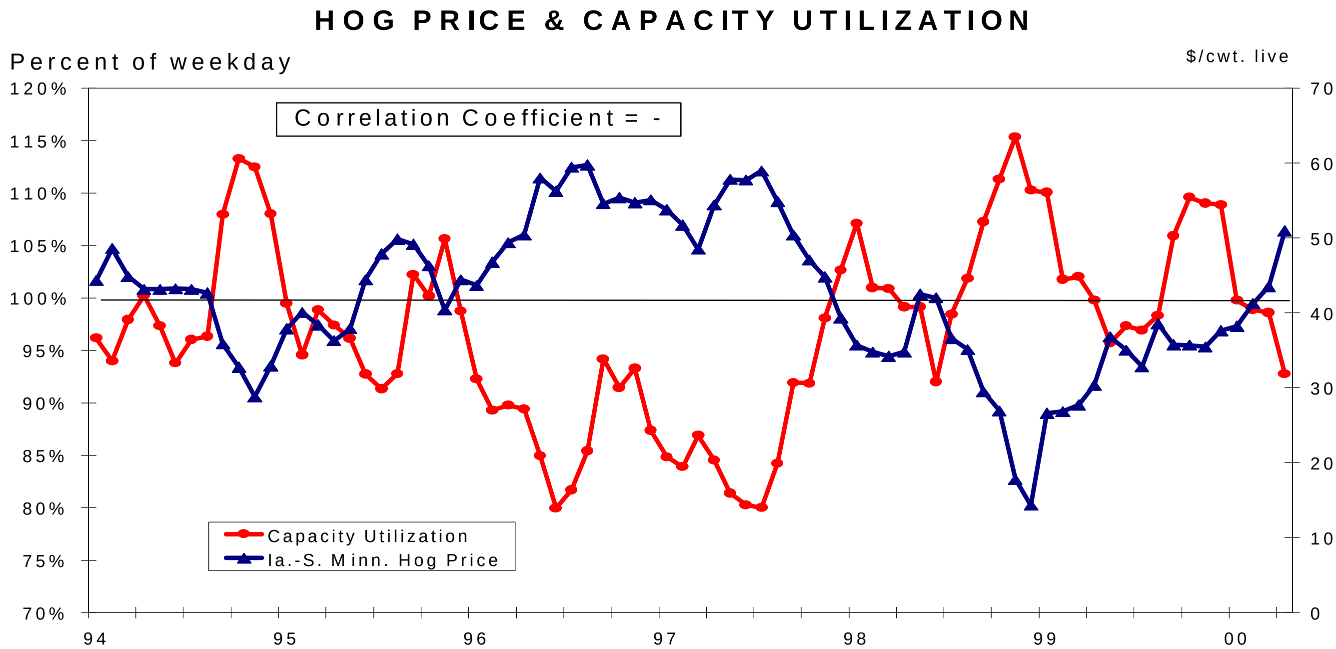
BUT THERE ARE HUGE RISKS FOR EXPANDED HOG PRODUCTION!

And foremost among them is the risk of another mismatch between the supply of hogs and the number of shackle spaces needed to get them slaughtered. U.S. slaughter capacity is now about equal to that of the fall of 1998. Canadian capacity has grown -- but so has Canadian production. Substantive increases in U.S. slaughter capacity will not be available until the fall of 2001. The graph at right shows the historical relationship between live hog prices and slaughter capacity utilization rates. Utilization rates could reach 110% and more in the fall of 2001 and 2002 with only modest herd expansion of 2-5% over the period.



Environmental Update

By: Joe Kelpinski-Extension AOE Swine Agent

Many items relating to environmental issues and swine production have been occurring over the last few months. Some of these items, such as the On Farm Odor Assistance (OFOA) program, and the Michigan Agricultural Environmental Assurance Program (MAEAP) will continue to help Michigan swine producers remain environmentally friendly while allowing economically viable swine production. A brief update on these items is in order.

Statewide, we continue to make tremendous inroads with producer sign-ups for the OFOA program. Through efforts of the Michigan Pork Producers Association and the MSU Extension Swine Team, education of producers about the benefits of this program has started to pay large dividends. Michigan is among the leading states nationwide for the percentage of their producers who have taken advantage of this program. The ability to have an independent assessment team view your operation provides an excellent opportunity to analyze your management strategies for: odor reduction, manure storage, manure handling, and land application, as well as evaluating other facets of the operation which improve aesthetics and neighbor relations. The best part of this is that this is done at no charge to you as the producer. All that NPPC, MPPA, and MSUE need from you is about an hour to an hour and a half to fill out the Form A to begin the ball rolling. On the day of the assessment, we also ask that you or your manager commit to going through the facility with the assessment team. Producers who have been through the program have found it to be highly productive and well worth the time spent. In addition, those producers who have gone through this program will automatically be eligible to receive certification under the MAEAP program, which we'll talk about next.

The Michigan Agricultural Environmental Assurance Program (MAEAP) was begun some eighteen months ago with the formation of a steering committee to guide the process along. This steering committee represents all of the parties who have a stake in agricultural and environmental issues statewide. This was done in response to increasing environ-

Update (Continued on Page 12)

mental rules and regulations being proposed on a national

Manure Sampling and Nutrient Analysis[1]

By: Natalie Rector[2], Brian Hines[3], and Roberta Osborne[4]
Michigan State University Extension Agents

Introduction
Manure sampling and nutrient analysis can provide valuable information to producers. This information can help them manage manure nutrients (nitrogen [N], phosphorus P_2O_5] and potassium [K_2O]) for land application and crop production in a way that saves money on fertilizer and protects the natural resource base. It can also assist in identifying production practices that can be changed to improve nutrient resource allocation.

Objectives
A team of multi-county extension agents developed and conducted this on-farm manure sampling demonstration to:

1. Provide producers with an estimate of the nutrient concentration of the manure from their system(s).
2. To assess the average concentration and the range of manure nutrient concentrations from various dairy and swine facilities.
3. To assess the variability of manure within a storage facility as it is emptied from the first to the last load.
4. Compare previously published results to the sampling average for total farm nutrient planning.
5. Assess manure nutrients from the same system at six and twelve month intervals.

Methods
From February 1998 to April 2000, the agents obtained manure samples from 21 swine farms, testing 25 deep pit finishing facilities and 7 nurseries. Samples from 15 dairy farms were tested; 8 having lagoon manure storage and 7 having a "daily haul" system. All but one of the dairy facilities utilizes sand bedding.

All manure samples were collected by the farmers, at the time when manure was being pumped out of the storage facility (or being scraped for daily haul) and transported to the fields. Multiple samples were collected over the time taken to empty the pit or lagoon by 10 of the participating swine producers and 6 of the participating dairy producers. This was done to investigate whether nutrient concentration varied as the pit or lagoon was progressively emptied. Most storage facilities were agitated during pumping. In some instances, pits were emptied totally, but in other cases, such as swine finishing buildings, the bottom foot or so was not totally extracted.

Bottles for manure samples (500 ml, plastic containers) were acquired from the University of Wisconsin Soil and Forage Analysis Laboratory and distributed to farmers at meetings, during farm visits or via the mail. Bottles were distributed in advance of manure removal. Having an empty bottle on-hand helped farmers remember to obtain a sample when hauling the manure.

The agents implemented a "fill it, freeze it, and call us" protocol for collecting samples. The producers were asked to collect samples the day they were hauling, freeze the samples and then call the agent. The agents then picked-up the samples, kept them frozen and mailed them in Styrofoam containers to the laboratory (University of Wisconsin Soil and Forage Analysis Laboratory, 8396 Yellowstone Drive, Marshfield, WI, 54449). The cost of sampling was covered by grant dollars (about $25 per sample).

The nutrient data is listed as pounds of total nutrients tested in the sample per 1000 gallons, unless otherwise noted. N, P_2O_5 and K_20 were analyzed. The numbers reported are the total nutrients tested in the manure samples prior to application to soils. Average nutrient concentrations determined in this study were compared to those published in the Livestock Waste Facilities Handbook (MidWest Plan Service; MWPS-18) for similar manure storage systems.

Results
The average nutrient concentration and the range of nutrient concentrations in the swine and dairy manure samples evaluated in this demonstration project are shown in Tables 1, 2, 3, and 4. Nutrient concentrations varied greatly from facility to facility, especially N and P, and there appears to be more variability in swine samples than in dairy. Average nutrient concentrations differed from "book" concentrations. The wide range in values and the disagreement with MWPS-18 values strongly suggests that producers should sample the manure produced in each specific production setting prior to land application.

Ten swine finishing facilities were sampled sequentially as the pits were emptied (Table 5). Six of ten farms showed little difference from top to bottom. On four of the farms, substantially greater amounts of phosphorus were found in manure samples taken from the bottom of the pit. These tend to be older facilities with less agitation.

Six sequential samples were taken from dairy facilities; all were outdoor, concrete lagoons. (Table 6). The samples indicate little variability from the beginning to end of emptying the storage facility.

Nutrient concentrations in samples taken from the same system, six to twelve months apart are listed in Table 7. The nutrient concentrations in manure from deep pits under swine finishers varied especially phosphorus. The relationship of these nutrient concentration changes to changes in management occurring over the same time is not fully known. In one case a new facility was sampled. Differences with time are likely reflections of a number of factors, including age of facility, age of hogs, genotype of hogs, dietary

Conclusions
Farm-specific analysis of nutrient concentrations in manure gives accurate and valuable

nutrient concentrations, feed waste, and water use or waste. Concentrations from the two dairy units did not differ over time.

Conclusions

Farm-specific analysis of nutrient concentrations in manure give accurate and valuable information. Furthermore, it improves manure nutrient management and producer awareness of environmentally friendly food production.

Book values are good planning tools, but when facilities are in operation, the best data is obtained from actual samples. Book concentrations can be used, especially when considering a new facility, but testing specific facilities may greatly alter the amount of land base necessary for phosphorous and will lend to greater accuracy in altering fertilizer rates for crop production.

The dollar value of manure nutrients is significant when compared to purchasing the same value as fertilizer. If the liquid swine and dairy manure were applied to cropland at a rate of 4000 gallons per acre, and the more solid sand-manure mixture was applied to cropland at rate of 10 tons per acre, the equivalent of about $67, $53, and $44 worth of fertilizer is being realized, respectively. This assumes that all nutrients become available to the crop over time.

Consistency of manure nutrients within an agitated storage facility (from top to bottom) does not appear to be as great as previous believed. Knowing that manure nutrients are consistent as storage facilities are emptied increases producer confidence in utilizing manure for optimum crop production. When producer confidence is increased, they are more willing to reduce applied fertilizer on manured fields. They will also take greater efforts to spread manure evenly across fields and keep records of applications.

Manure testing provides producers with additional information that can be used in making animal management decisions. For example, observing very high nitrogen concentrations may be cause to reevaluate diet formulations.

The drawback to manure sampling at the time of land application is not having the test results to determine the application rate. If a producer is sampling both soils and manure on a regular bases, they will gain a good sense of what they are doing and use the manure sampling as a double check. Manure analysis can generally be accomplished in time to adjust spring nitrogen sidedress rates. If manure is being applied based on phosphorous soil test levels, the soil tests will direct the priority of fields that are spread.

Interest and feedback from the participating farmers was very positive. In this project, agents made the sampling process as easy for producers as possible, which was one factor contributing to the success of this project. Often producers would like to test their manure, but they do not known how to easily get the job done. Most producers are willing to pay for the samples, but the more stressful part for them is being sure to have containers on-hand, and knowing what to do with samples after collecting them.

[1] *This project was conducted with funds received from the Michigan Animal Initiative and the MSU Animal Industry Coalition, the Sustainable Agriculture Research and Education Program (SARE), and the MDA Michigan Groundwater Stewardship Program.*

[2] *Extension Field Crops Agent, Branch and Calhoun Counties*

[3] *Extension Livestock Agent, Branch, Calhoun, Hillsdale, Jackson, Ingham and Eaton Counties*

[4] *Extension Dairy Agent, Hillsdale, Branch, Monroe and Lenawee Counties*

Table 1. Twenty-five swine farms having finishing facilities with deep pit manure storage (generally 8-ft deep pits with 7 ft of use-

	Total nutrients per 1000 gallons		
	N	P_2O_5	K_2O
Average	44	17	22
Range	28 to 82	6 to 34	12 to 49
MWPS-18	36	27	22
Value of manure as fertilizer	$9.24	$4.25	$3.30

Table 2. Seven swine farms having nursery phase production fa-

	Total nutrients per 1000 gallons		
	N	P_2O_5	K_2O
Average	34	13	17
Range	18 to 59	6 to 25	13 to 28
MWPS-18	25	19	22
Value of manure as fertilizer	$7.14	$3.25	$2.55

Table 3. Seven dairy farms having outdoor, concrete lagoons for

	Total nutrients per 1000 gallons		
	N	P_2O_5	K_2O
Average	31	13	24
Range	14 to 47	4 to 18	14 to 41
MWPS-18	24	18	29
Value of manure as fertilizer	$6.51	$3.25	$3.60

Table 4. Eight dairy farms using daily haul of manure and sand

	Total nutrients per 1000 gallons		
	N	P_2O_5	K_2O
Average	10	4	9
Range	9 to 14	4 to 6	6 to 13
Value of manure as fertilizer	$2.10	$1.00	$1.28

Table 5. Sequential sampling of swine, deep pit finishing barns (generally 8-ft deep pits with 7 ft of useable storage capacity).

Site		Total nutrients per 1000 gallons N	P_2O_5	K_2O
1	Top	49	21	24
	Middle	50	19	26
	Bottom	50	19	21
2	Top	43	7	25
	Middle	42	6	22
3	Top	45	17	24
	Middle	51	29	25
4	Top	51	25	25
	Second	50	23	24
	Middle	52	20	26
	Fourth	52	25	27
	Bottom	51	21	26
5	Top	44	13	20
	Middle	47	13	23
	Bottom	52	22	24
6	Top	50	10	21
	Bottom	57	22	24
7	Top	82	17	36
	Middle	84	20	32
8	Top	70	28	32
	Middle	67	32	33
9	Top	48	13	17
	Middle	49	19	18
	Bottom	66	29	22

Table 6. Sequential sampling of dairy concrete outdoor lagoons.

Site		Total nutrients per 1000 gallons N	P_2O_5	K_2O
1	Top	31	13	20
	Middle	30	14	19
	Bottom	28	13	18
2	Top	39	13	27
	Middle	38	13	27
	Bottom	38	16	35
3	Top	31	15	24
	Second	30	14	23
	Middle	31	13	22
	Fourth	31	13	22
	Bottom	32	14	29
4	Top	36	15	25
	Bottom	35	16	26
5	Top	23	13	13
	Bottom	26	16	16
6	Top	[illegible]	16	39
	Bott[illegible]	[illegible]	[illegible]	42

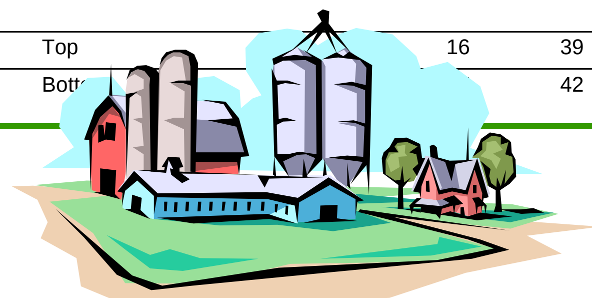


Table 7. Manure samples from the same system at two different times within a year.

Site			Total nutrients per 1000 gallons N	P_2O_5	K_2O
1	May-99	Swine Finishing	43	7*	24
	Dec-99	Swine Finishing	48	23	25
2	Jun-99	Swine Finishing	83	19	34
	Nov-99	Swine Finishing	69	30	33
3	Feb-99	Swine Finishing	48	16	23
	Dec-99	Swine Finishing	44	22	19
4	Feb-99	Swine, Flush, outdoor	6	1	6
	Dec-99	Swine, Flush, outdoor	4	2	3
5	Mar-99	Dairy Lagoon	49	15	31
	Mar-00	Dairy Lagoon	44	14	33
6	Apr-99	Dairy Lagoon	31	14	24
	Dec-99	Dairy Lagoon	36	16	26

*First time new pit was emptied

First time new pit was emptied

Managers Still Needed

By: Dr. Ron Bates, State Swine Specialist
Michigan State University

Over the last 15 years the swine industry has challenged itself to modernize. Much time has been spent understanding new technology and different management practices to improve the competitiveness of pork producers. Farms have typically increased in pig inventories and that increased inventory was placed into buildings that are better suited to the pig's environmental needs than ever before. Breeding systems have changed to capture the specificity of lines and breeds and to further capture genetic change ongoing within specialized lines and breeds. Nutritional guidelines have increased in complexity with the goal of betting meeting the pig's changing nutritional needs throughout its life cycle. Management practices have become much more intensive with the assumption that the pig will respond with improved performance.

These dramatic changes have been costly. However, the assumption of these investments has been that it would help maintain if not improve profitability for pork producers and make the industry more competitive as the world becomes a global market. Pork producers have made the investment to be competitive, but it must be understood that upgrading technology and facilities is not the end but only a means to improve business profitability and competitiveness.

In Table 1 is a synopsis of the 1999 Iowa State Enterprise Record Summary for farrow to finish farms within their record system. It summarizes the characteristics of average, high and low profit farms for 1999. There are several interesting items to note regarding the high one-third and low one-third profit farms.

Low profit farms were larger, had higher pigs weaned per sow per year and litters weaned per crate per year. These farms carried more dept, and had higher expenses in every category listed even though they sold more pigs per sow, which would spread overhead costs over more pigs. Their feed costs were higher both on a per ton and on a per pound of pork produced basis. Even though these farms had more pigs to sell, they sold them for less than the average and high profit farms. The difference in profit between low profit and average farms was $14.28 per pig while the difference between low and high profit farms were $26.52 per pig.

It would be difficult to know exactly all the nuances between these farms and why they differ for profitability but some speculation can be made. Since low profit farms had higher depreciation costs it is reasonable to think that they had built some new facilities in recent years and increased in herd size. Sow productivity was better which may indicate that they had improved their mating practices and possibly upgraded their genetic programs. Feed costs per ton of feed were higher which might indicate improved diets and phase feeding.

These possible changes within the farm business would often be considered steps in the right direction. However, there are some glaring problems. Within the breakdown of cost of production, these farms were not as diligent at optimizing their return on investment. Each category shows higher costs per unit of pork produced. If these farms did build new facilities it would be expected that their depreciation would be higher. However, other cost categories must be managed so to offset higher deprecation. Furthermore higher feed costs per ton can only be justified if feed costs per unit of pork produced are lower. In other words higher priced feed should result in improved feed efficiency to justify its higher cost.

The overall objective within the pork business is the same as all other businesses. Take in more money than you spend. The bigger the difference between sales and expenditures the easier it is to stay in business. It is easy to say but can be difficult to do. Pig farming is a high risk, high profit agricultural business. It has changed dramatically over the last decade and pork producers have had to change as quickly to stay competitive. However, incorporating new technology and investing in the business has to be matched with intensive production and financial management so that the returns received are higher than cost of production.

Managing the farm business can be made easier with better records and using industry benchmarking of farm performance. However, all aspects of the farm business must be managed to be successful. It has been said that over the course of a livestock business, good and bad performance does not average but it cancels out. That can be true as seen within Table 1. Even though, low profit farms were larger, may have added new facilities, adopted new technology and did have higher sow productivity, they had higher costs of production and poorer feed efficiency that resulted in a loss. It is true that 1999 was a terrible year for pork producers and those who had recently expanded had it more difficult due to higher leverage and depreciation costs. However, low dept and low depreciation are not the only avenues to profitable pork production. Production and financial management of the pork business is necessary to achieve success. Adoption of new technology and business growth by themselves will not ensure profitability. These business strategies must be incorporated in a manner that productivity and profitability can be achieved.

1999 ISU Swine Business Record Summary – Farrow to Finish

Item	Average	Top 1/3	Bottom 1/3
Production Summary			
Avg Female Inventory	251	180	307
Litters Weaned/Female/Year	1.91	1.96	1.94
Pigs Weaned/Female/Year	16.8	16.8	17.5
Litter Weaned/Crate/Year	9.6	9.0	10.7
Feed Fed/Cwt of Pork Produced	348	349	354
Financial Summary			
Price Received/Cwt , all market animals, $	33.30	33.89	33.14
Feed Cost of Diets per cwt, $	5.62	5.53	5.82
Feed Cost/Cwt Pork Produced, $	19.54	19.22	20.57
Vet Services/Cwt Pork Produced, $	1.36	1.19	1.70
Utilities, Fuel, Telephone, etc. , $	1.42	1.37	1.55
Other Operating Costs except labor/Cwt, $5.53	5.53	4.59	6.67
Labor per Cwt of pork produced, $	4.48	4.15	4.68
Depreciation, Taxes, etc/cwt produced, $	2.78	2.58	3.20
Fixed Cost per Female Maintained, $	177	160	205
Fixed Cost per Crate Maintained, $	897	747	1102
Total Cost per cwt of pork produced, $	34.84	32.89	38.22
Profit Summary			
Return per hour to Labor & Mgmt, $/hr	17.31	4.8	29.75
Percent Return on Capital, %	20.14	37.79	1.33
Net Profit per Female Maintained, $	141	339	(79)
Net Profit per Crate Maintained, $	600	1,463	(483)
Net Profit per Pig Marketed, $	8.56	20.80	(5.72)

Hormonal Therapy for Sows Weaned During Fall and Winter[1,2]

By: Dr. R. Bates, J. Kelpinski[3], B. Hines[3] and D.Ricker[4]
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Summary
Sows from five commercial herds, weaned in the fall and winter were used to study the potential of P.G. 600 treatment to stimulate subsequent litter size born. At weaning sows within parity (1, 2, 3 through 6) and lactation length classification (early weaned, ≤ 14 days; conventionally weaned, >14 days) were randomly assigned to treatment. P.G. 600 did not change subsequent rebreeding performance for parity 1 and parity 3 through 6 sows. However, conventionally weaned parity 2 sows treated with P.G. 600 had a greater (P <.05) return to estrus than controls (99.0 vs 93.6%, respectively). For both parity 1 and 2 sows, treatment did not significantly change farrowing percentage. However, farrowing percentage was greater (P < .05) among P.G. 600 treated parity 3 to 6 sows conventionally weaned (84.4 vs 71.3%, respectively). Subsequent litter birth weight for parity 1 sows treated with

P.G. 600 was lower (P < .02) when compared to controls (34.4 vs 36.6 lb, respectively). Subsequent litter size at birth was not affected by treatment for both parity 1 and 2 sows. However, early weaned parity 3 through 6 sows treated with P.G. 600 had more (P < .06) total number born compared with controls (12.4 vs 10.6, respectively). P.G. 600 improved reproductive function within specific parity and lactation length classification for sows weaned in the fall and winter.

Introduction

P.G. 600 is the only federally approved compound for estrous stimulation of non-cycling females for the U.S. pork industry and is marketed under the trade name P.G. 600 by Intervet, Inc., Millsboro, DE. Evidence exists that compounds, like P. G. 600, given near the natural time of estrus may increase litter size. This study was conducted to determine if sows treated during the fall and winter with P.G. 600 would have larger litters at subsequent farrowing.

Materials and Methods

Commercial sow herds within Michigan were used to complete this study during of the fall of 1996. Approximately 200 sows from each herd were included. At weaning, within each herd, sows were randomized to treatment (P.G. 600 or no treatment) within parity and lactation length classification by Michigan State University personnel. Three parity classifications were used; parity 1, 2, and 3 through 6. Sows were classified as either weaned early (≤ 14 days of lactation; avg=12.5 days) or conventionally weaned (> 14 days of lactation; avg=17.2 days). Estrus detection commenced for 60 days after weaning.

Information summarized was; percentage return to estrus, percentage return to estrus within 7 days after weaning, percentage subsequently farrowed, subsequent total number born, subsequent number born alive, subsequent born dead, subsequent mummies born and litter birth weight. One herd experienced an outbreak of Transmissible Gastroenteritis and Porcine Reproductive and Respiratory Syndrome at the onset of farrowing. Farrowing records (i.e. percentage farrowed, total number born, number born alive, dead and mummies and litter birth weight) from this herd were not included in the analyses.

Results and Discussion

Within parity 1, treatment differences were not detected for percentage return to estrus, return to estrus within 7 days and percentage farrowed and averaged 96%, 82.5% and 83%, respectively.

Treatment differences were not significant within parity 2 sows for percentage return to estrus within 7 days after weaning and percentage farrowed and averaged 91% and 74%, respectively. However there was an interaction of treatment with lactation length classification for percentage return to estrus. Sows conventionally weaned and treated with P.G. 600 were more likely (P < .04) to return to estrus than control sows (99.0 vs 93.6%, respectively). Treatment differences for sows weaned early were not significant and averaged 92.7% and 90.6% for P.G. 600 treated and control sows, respectively.

Treatment did not alter percentage return to estrus or percentage return to estrus within 7 days after weaning among parity 3 through 6 sows and averaged 95.5% and 92%, respectively. However for parity 3 through 6 sows, a treatment by lactation length classification interaction was noted for percentage farrowed. Conventionally weaned sows treated with P.G. 600 were more likely (P < .06) to farrow a subsequent litter than control sows (84.4 vs 71.3%, respectively). For early weaned parity 3 through 6 sows, those treated with P.G. 600 did not significantly differ from controls (64.0% vs 72.9%, respectively).

Subsequent farrowing performance is reported in Table 1 for parities 1 and 2. Parity 1 sows treated with P.G. 600, had lighter (P < .02) subsequent litter birth weight as compared to non-treated controls. There was a non-significant improvement in number born alive of .91 pigs for P.G. 600 treated parity 1 sows as compared to controls. This is consistent with a previously reported (Kirkwood et al., 1998) increase of .7 pigs in subsequent number born alive for parity 1 sows treated with P.G. 600 at weaning. It is known that higher number born alive can cause individual pig birth weight within the litter to be lower. In the present study, litter birth weight was corrected to a constant number born alive across treatments. Since parity 1 P.G. 600 treated sows had higher number born alive at their subsequent farrowing it appears that average pig birth weight was lower. This would cause litter birth weight to be lower since it was corrected to the average numbe born alive across treatments. These results suggest P.G. 600 treated parity 1 sows had smaller average birth weight pigs than control sows, due to larger litter size.

No other treatment differences were detected for either parity 1 or 2 sows. Within parity 3 through 6 sows, there was an interaction with treatment and lactation length classification for total number born. Among sows weaned early, those treated with P.G. 600 had more (P =.05) total number born at their subsequent farrowing than controls (12.4 vs 10.6, respectively). The difference between P.G. 600 treated and controls was not significant among conventionally weaned sows (12.8 vs. 13.3, respectively).

Number born dead (Table 2) tended (P <.09) to be greater for parity 3 through 6 sows treated with P.G. 600 than controls. Total number born (avg 12.6) for P.G. 600 treated sows observed in this study was high. Larger litter size will cause an increase in the number of stillborns. This may explain the increase in number born dead observed in P.G. 600 treated parity 3 through 6 sows in this study.

Conclusions

This study investigated the potential of improving subsequent litter size of fall and winter weaned sows given P.G. 600. Parity 1 sows treated with P.G. 600 had lighter adjusted litter birth weight due to a non-significant increase in litter size. Parity 3 through 6 sows exhibited the greatest favorable response to P.G. 600. Treatment of parity 3 through 6 sows at weaning with P.G. 600 in the fall and winter can improve subsequent fertility through one of two means. If weaned before 15 days of lactation and treated with P.G. 600 their subsequent litter size should increase. If weaned after 14 days of lactation and treated with P.G. 600 at weaning, farrowing rates should improve.

Literature Cited

Kirkwood, R. N., F. X. Aherne, and G. R. Foxcroft. 1998. Effect of gonadotropin at weaning on reproductive performance of primiparous sows. Swine Health & Prod. 6:51-55.

[1]The use of trade names in this publication does not imply endorsement by Michigan State University or criticism of similar products not mentioned. The gonadotropin combination P.G. 600 is a registered trademark of Intervet America, Inc. Millsboro, DE.

[2]The authors gratefully acknowledge Intervet America, Inc. for their partial support of this study. The authors further wish to thank Bloomer Enterprises, Sebewaing, Barton Farms, Homer, High Lean Pork, Inc., Remus, McKenzie-Reed Farms, Decatur, and Norton Farms, Coldwater for their participation in this study.Contact Ron Bates for further information regarding this study.

[3]AoE Swine Agent.
[4]Former AoE Swine Agent.

Table 1. Litter characteristics within parity 1 and 2.

Parity 2			

^{a,b}Means within a row with different superscripts differ (P<.02).

Table 2. Litter characteristics for parity 3 through 6.

Item	Control	P.G. 600	STD ERR
Number born alive	10.8	11.5	.7
Number born dead	$.4^a$	$.5^b$	.6
Number of mummies	.0	.1	.2
Litter birth weight, kg	34.8	35.5	1.5

^{a,b}Means within a row with different superscripts differ (P<.09).

Low Phytic Acid Corn Improves Ca and P Utilization for Growing Pigs

By: T.L. Veum, D.W. Bollinger, J. Smith, L. Harmon,D. Ledoux, V. Raboy [1] and D.S. Ertl [2]

An experiment was conducted to evaluate the nutritional value of a genetically modified low phytic acid (lpa)mutant corn (MC). The MC is homozygous for the lpa1-1 allele and contains reduced levels of phytic acid (65% less) compared to a near isogenic normal hybrid corn (NC) (Raboy and Gerbasi, 1996; Ertl et al., 1998). Criteria evaluated were growth performance, utilization of P, Ca, and N, and the breaking strengths of the third metacarpal and radius bones. Crossbred barrows (n = 35) averaging 14.5 kg, were placed on one of five treatments containing either (1) NC +whey protein concentrate (WPC), (2) MC + WPC, (3) NC + WPC + .1% iP (inorganic phosphorus), (4) NC + soybeanmeal (SBM) or (5) MC + SBM, for 35 days.

Bottomline:
It was determined that available P (aP) in MC was 4 to 5 fold greater than NC. Pig performance, N utilization, P absorption, and bone strength were similar for pigs fed NC or MC (trt. 2 vs 3 and trt. 4 vs 5) when the diets were equalized in available P (aP). MC reduced P excretion by 50% when it was the sole phytic acid source and by 20% in a corn-SBM diet. MC also reduced Ca excretion and increased Ca absorption.

1999 University of Missouri-Columbia Animal Sciences Departmental Report
[1] USDA, ARS, Aberdeen, ID.
[2] Optimum Quality Grains, Johnston, IA.

Digestibility and Relative Phosphorus Bioavailability of Normal and Genetically Modified Low Phytate Corn for Pigs

J. D. Spencer, G. L. Allee, T. E. Sauber[1] , D.S. Ertl[2] , and V. Raboy[3]

A genetically modified corn hybrid homozygous for the *lpa1* allele, containing low phytate (LP) and its near-isogeneic equivalent hybrid (Normal) were fed to pigs in two studies to determine phosphorus availability and effects upon nutrient retention and excretion. Additionally, an in-vitro assay was conducted to estimate P availability. In the first experiment, breaking strength was regressed on added P intake, and the Bioavailability was determined by slope ratio. The bioavailability of P for LP and Normal corn was 64 and 10%, respectively. This was similar to in-vitro values of 57 and 11%. In a total collection trial, pigs fed diets formulated with LP corn and no supplemental P excreted 37% less total phosphorus when compared to pigs fed Normal corn diets supplemented with .2% P.

Bottomline:
These studies show that the available P content of LP corn is approximately 5 to 6 times greater than Normal corn, and that P excretion by pigs can be greatly reduced when diets are formulated on an available P basis with LP corn.

1998 University of Missouri-Columbia Animal Sciences Departmental Report
[1] Optimum Quality Grains L.L.C., DesMoines, IA
[2] Pioneer Hi-Bred Intl. Inc., Johnson, IA
[3] USDA/ARS/NSGGRL, Aberdeen, ID

Grow-Finish Performance of High Lean-Growth Barows Fed Normal and Genetically Modified Low Phytate (LP) Corn

J.D. Spencer, G.L. Allee, T.E. Sauber[1] , D.S. Ertl[2] , AND V. Raboy[3]

A genetically modified corn hybrid homozygous for the *lpa1* allele, containing low phytate (LP), and its near-isogenic equivalent hybrid (Normal) were fed to 210 high lean-growth barrows to compare pig performance. During the grower phase (60 to 160 lbs), pigs were allotted in a RCBD (7 pigs/ pen) in a 2x2 factorial arrangement with 2 corn lines (LP and Normal) and 2 levels of added P (0 and .2%) from dicalcium phosphate. The finishing phase (160 to 250 lbs) was a 2x3 factorial arrangement with the 2 types of corn, and 3 regimens of added P for the entire grow-finish period.
Real-time ultrasound was used at the end of the grower and finisher phases to evaluate 10 th rib backfat (BF) and loin eye area (LEA). Breaking strength (BS) of the 3rd metacarpal was evaluated from 1 pig/pen at the end of the grower phase, and from all pigs after slaughter. Pigs fed diets formulated with LP corn displayed larger LEA at the end of the grow-finish period compared to pigs fed Normal corn diets

and BS when compared to pigs fed Normal corn with no added P, and similar performance to those fed LP and Normal corn with added P.

Bottomline:
These results show that the availability of P in a LP corn/SBM diet was improved and may be sufficient for grow-finish swine with no supplemental P.

1998 University of Missouri-Columbia Animal Sciences Departmental Report
[1] Optimum Quality Grains L.L.C., DesMoines, IA
[2] Pioneer Hi-Bred Intl. Inc., Johnston, IA
[3] USDA/ARS/NSGGRL, Aberdeen, ID

Grow-Finish Performance and Carcass Characteristics of Pigs Fed Low Phytate Corn in a Commercial Confinement Facility

By: J.D. Spencer , G.L. Allee, T.E. Sauber[1] ,C.D. Hagen[2] and C. Berentschot[2]

A study was conducted to determine the effects of feeding a genetically modified low phytate corn (LP) on growth performance and carcass characteristics of grow-finish gilts in a commercial confinement facility. Approximately eleven hundred gilts were randomly assigned to one of three treatments consisting of : 1) normal corn/SBM diet at .29% available P; 2)LP corn/SBM diet at .29% available P; 3)same as #2 for eight weeks, then no P supplementation. Twenty six pigs were placed in each pen measuring 10 by 18 feet with ad libitum access to one five-hole dry feeder and two nipple waterers. There were 14 replications per treatment, plus two observational pens of pigs fed LP diets without supplemental P throughout the grow-finish period that were not included in the statistical analysis. Animal weights were taken biweekly for calculation of ADG, ADFI, and feed efficiency (F/G). At the time of slaughter (average BW of 270 lbs) two carcasses per pen were randomly selected for determination of bone breaking load of the 3rd metacarpal (BL) with an Instron machine. Carcass measurements were collected at the time of processing.

For overall performance throughout the grow finish period, there was no significant difference between treatments for ADG, ADFI, or F/G. There was no difference ($P > .05$) in BL, while pigs fed LP corn diets showed an increase ($P < .001$) in percent lean (56.2 and 56.6 vs. 55.8) and decrease in carcass backfat (.65 and .63 vs. .68 inches). Low phytate corn with no additional P throughout the grow-finish trial did not have any negative affects on growth performance, carcass characteristics, or bone strength.

Bottomline:
These results show that LP corn can be fed to grow-finish swine under commercial conditions with no depression in performance or carcass characteristics. Furthermore, economic benefits of decreased P excretion and inorganic P supplementation, combined with the improved carcass quality, make feeding LP corn very desirable and justifiable.

1999 University of Missouri-Columbia Animal Sciences Departmental Report
[1] Optimum Quality Grains, LLC, Des Moines, IA.
[2] Iowa Select Farms, Iowa Falls, IA.

ELECTRONIC SWINE NEWS UPDATES

If you have a computer and have an e-mail address, you might be interested in receiving current news and information about the swine industry as it happens. The MSU Swine Extension team has been sending out electronic news updates to other producers and extension educators for about six months. Time is precious for every one of us, and time is what many of us needs to keep abreast of changes and happenings in the industry. The World Wide Web has allowed information to get out almost instantly, but finding it may be somewhat cumbersome. What the news updates try to do is summarize this information for you, search those various sites and compile information that may be useful. The news is sent out on an as needed basis and comes from a variety of resources. The electronic update is comprised of short articles in digest form to alert you to news in the industry, abstracts of research reports, and major market news and analysis. While not meant to replace your DTN, news updates do provide some of the other information that may be helpful to your operation. Best of all its FREE. Simply send an e-mail message to Tim Johnson at <johnsoti@msue.msu.edu> and include a short note that you would like to be added to our mailing list and you too can begin receiving regular updates. If you don't like the results, simply let me know and I can remove your name from the list.

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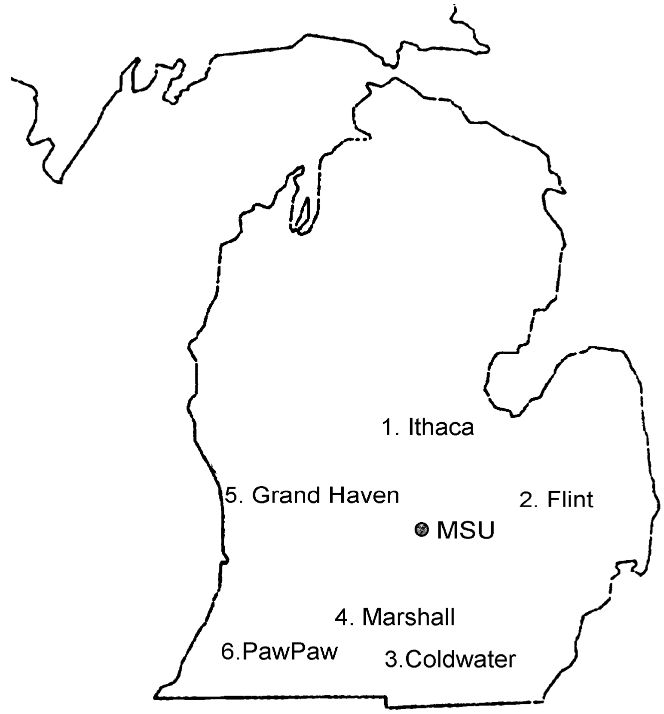
All comments and suggestions should be directed to:

MICHIGAN STATE UNIVERSITY EXTENSION



(Update From Page 2)
mental rules and regulations being proposed on a national and statewide basis. The concept was to put together a program that was voluntary, yet was thorough enough to assure the public at large that we in agriculture were not only serious about environmental issues but had the foresight to be proactive at addressing the issue. The MAEAP program is not only for livestock producers, but for ALL of Michigan's agricultural producers. There are components of the program that can be used to address many different types of farm enterprises. At this point in time, the program looks to be almost ready to initiate. Final plans and enactment procedures are already underway, and a best guess would see the official rollout about January 1, 2001. This program, much like the OFOA program, is designed to help put producers in a position to insure they remain in compliance with future regulations while allowing them to make modifications to existing practices in an economically viable way. Those producers who have gone through the OFOA program will be eligible for certification under this program. For those who have not done the OFOA program, they will likely need to hire a consultant to help complete portions of this program, which will be money out of their own pocket. Again, another excellent reason to go through the OFOA program. I will fill you in on developments with the MAEAP program as we get closer to its initial launch.

To wrap up this issue, it would be remiss to not talk about the controversy in Washington D.C. over the E.P.A. and it water quality management plans involving Total Maximum Daily Loads (TMDL's). Some of you may have heard about this issue, as it's the subject of great debate on the environmental front. As part of the Clean Water Act, and also it's method to help clean up our water resources, the EPA has the TMDL's that are utilized to help control the amount of pollutants released into surface waters. Each waterway is assigned a maximum amount of a particular pollutant that can be placed in the waterway, from ALL sources, each day. This was done to help reduce/eliminate pollutants from point sources of discharges (factories, municipalities, etc.). However, EPA now wants to expand this to include both point and non-point sources of discharge. Non-point sources include both forestry practices and agriculture. This could drastically impact how we in agriculture utilize nutrients and chemicals in our production systems. At the time of this writing, EPA and the administration were pushing to quickly enact this, while Congress was working to head things off. We will be watching this issue very closely in the coming months to see what actually develops.

In closing, I encourage all of you to sign up for the OFOA and in the near future, the MAEAP programs. Both will provide sound, useful information that will help improve your management practices. Information on either of these programs can be obtained from your MSUE Swine Team Agents or the Michigan Pork Producers Association.