

centred on SWINE

The Newsletter of Prairie Swine Centre Inc.



In This Edition

Winter 2003 Volume 10, Number 4

Wheat and Barley Quality 2

Low Crude Protein Diets Reduce
Nitrogen Output in the Manure,
But Are They Practical? 4

Feed Intake: Revisiting an
Old Challenge 6

Personal Profiles 8

The Importance of Feed and Feeding the Lactating Sow



Program funding provided by



Saskatchewan
Agriculture, Food
and Rural
Revitalization

Brian Andries, BSA, Manager-Operations,
Prairie Swine Centre

Maintaining high levels of feed intake during lactation not only benefits the litter currently on the sow but subsequent litters, as well as improving sows' overall productivity. Problems arise, especially in parity 1 and 2 sows, if they do not consume enough feed in lactation to meet their energy requirements for maintenance, growth and milk production. If this happens, milk production declines and conditioning is lost as fat reserves are mobilized to synthesize milk. This loss of fat and accompanying loss of protein mass affect reproductive performance. This results in the sow's weaning to rebreeding interval being extended, and farrowing rate and subsequent litter size is also challenged as the number of eggs ovulated decreases.

The effect of decreased feed intake on the sows' litter is also important. There is a direct correlation

between feed intake and piglet performance. As feed intake increases, milk production rises, increasing piglet growth rates. A sow that is milking well should also have decreased pre-weaning mortality rates.

There are a number of things that can be done to ensure that sows will be consuming sufficient feed to avoid excessive weight loss during lactation.

Under normal commercial conditions it is unlikely that gestation feed levels will influence litter size unless feed intake is restricted significantly reducing ovulation rate and subsequent embryo survival. Targets for weight gain in gestation should be based on backfat at the time of weaning and her weight at weaning. Sows at all parities should have 18-20 mm backfat at the time of farrowing.

How To Reach Your feed Intake Targets

- Sows should be fed an extra 1 kg of feed at day 100 from breeding.

Continued on page 3

Large Groups for Grower-Finisher Pigs: Impacts on Pig Productivity



Thusith Samarakoe, M.Sc. and
Harold W. Gonyou, Ph.D.

Over the past few years the North American swine industry has been adopting the "large group" concept for pigs, i.e. group sizes of 50-500 pigs/pen, as compared to conventional group sizes of 10-40 pigs/pen. A considerable cost in terms of designing housing for pigs is associated with the internal facilities of rooms. "Large groups" need comparatively less penning and other facilities, such as passageways within rooms, and could therefore reduce housing cost, improve space use and improve overall profitability. Moreover it gives

consisted of two pens of Large Group and four pens of Small Group size. A total of two thousand three hundred and four barrows and gilts (Pig Improvement Canada) were used in the experiment at the PSC Elstow facility. The animals weaned at approximately 18-days of age, were then held in nurseries for eight weeks, before starting the experiment at eleven weeks of age. The ratio of barrows to gilts was kept constant (1:1) between the two group sizes and the average starting weight of pigs was $31.8 \text{ kg} \pm 5.4 \text{ kg}$ (S.D). Pigs were housed on fully-slatted floors with floor space allowance per pig of 0.76 m^2 (8.2 ft^2).

Wet/dry feeders supplied feed and water to the animals, with a pig to feeder space ratio of 9 to 1.

During four trials of the experiment average daily feed intake (ADFI) was recorded for two growing-finishing periods, from week 2 to 5 and week 7 to 11. The values obtained were used to evaluate performance data on ADFI and efficiency during the above two periods.

To evaluate the group size effect on carcass quality, some carcass measurements were collected on pigs weighing over 110 kg. Pigs, which were above the targeted weight (110 kg), were transported to a commercial slaughter facility at the end of each trial, starting at week 11. Measure included dressed weight, estimated fat (mm), lean (mm) and a calculation for estimated percentage lean yield.

In addition, a record on the number of pigs that were taken off test and their corresponding health reason for removal was maintained throughout the entire experiment.

Average Daily Gain

One concern about large group size is the potential for reduced growth rate. In our study, for the entire 11 week experimental period, pigs in larger groups had a lower (2%, $P < 0.05$) ADG compare to pigs in smaller groups (Figure 1). This reduction in ADG was most severe during the first two weeks after the formation of larger groups.

"a total of 2304 barrows and gilts were used in group size comparisons"

a greater flexibility in designing rooms and could simplify some aspects of management. Thus it makes an economically attractive option for pig producers.

However, there are concerns that social instability of pigs in large groups may result in poor growth rates, higher mortality and morbidity, and may result in higher variation in body weights at the end of production. Therefore, the present study was designed to compare the production performance of grower-finisher pigs formed into larger groups to a conventional small group size and see if this trend in the pig industry is beneficial to producers and pigs.

To address this question, eight blocks, which consisted of two group-size treatments, 18 (Small Group) and 108 (Large Group) grower-finisher pigs per pen, were carried out over time. Each block, which lasted 11 weeks in duration,

Feeders were spread equidistantly along the central line in large groups with four feeder holes per feeder location. This maintained an equal distribution of feeders within the large group, giving an equal opportunity for all the pigs to access the feeders without any difficulty.

Pigs were weighed on an individual basis at the beginning and end of the experiment and the coefficient of variation (CV) for each pen was calculated to evaluate the body weight variation at the beginning and the end of each trial. Pigs were weighed on weeks 2, 5 and 7 to obtain the average daily gain (ADG).

Figure 1. Effect of group size on ADG ($P < 0.05$, Wk 0 - 2 and Wk 0 - 11)

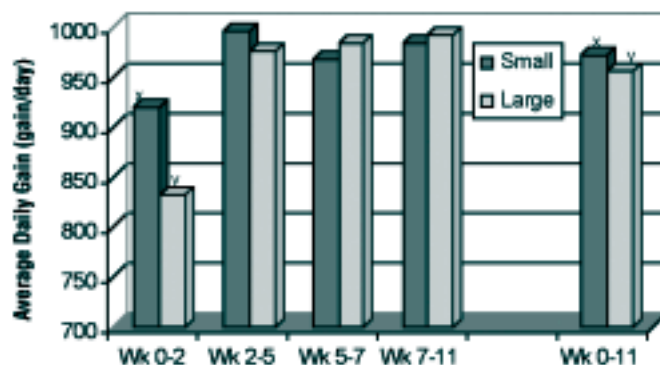


Table 1. Initial and final body weight, coefficient of variation, and carcass quality measurements of grower-finisher pigs in two different group sizes^a

Item	Small (18 pigs/pen)	Large (108 pigs/pen)	SEM	P<
Initial				
BW,kg	31.9	31.6	0.15	NS
CV,%	14.8	15.7	0.39	NS
Final				
BW,kg	106.6 ^x	104.9 ^y	0.41	0.01
CV,%	9.6	10.3	0.34	NS
Carcass quality measurements ^b				
Back fat, mm	21.6	21.9	0.39	NS
Lean, mm	61.1	60.7	0.24	NS
Predicted percentage lean, %	59.5	59.3	0.16	NS
Dressed weight, %	90.7	90.2	0.42	NS

^a Mean initial and final weights and coefficient of variation, least squares means.

^{xy} Means within the same row having different superscripts differ.

^b Pigs weighing less than 110 kg were not considered for carcass quality measurements.

During this period, pigs in smaller groups have a higher (10%, $P < 0.001$) ADG, compare to the pigs in larger groups. During wk 2 through 5, wk 5 through 7 and wk 7 through 11 of the experimental period no differences in ADG were observed (Figure 1).

Feed Intake

Furthermore, ADFI (kg/d) measured during two grower-finisher periods was similar between the two group sizes (2.46 vs. 2.46 ± 0.04 SEM during wk 2 to 5 wk, and 3.15 vs. 3.13 ± 0.04 SEM during wk 7 to 11 wk for small and large group). The feed efficiency (ADG/ADFI) was not affected by the large group size for two of these experimental periods.

Variation


Increased variation in pig body weight at the end of production cycle, which is being argued in terms of higher competition for resources and increased social stresses on pigs in large groups, is one other major concern with large groups of pigs. Interestingly, pig body weight variation within the group at the end of each experimental period, which is demonstrated by CV, was not affected by the large group size (Table 1), suggesting that pigs in larger groups may have had equal opportunity to utilize available resources with little difficulty.

It has been suggested that there could be higher levels of undesirable behavioural vices


such as tail biting or higher incidence of diseases and mortalities with the formation of pigs into large groups. Our results suggest that a similar proportion of pigs were removed regardless of group size. Of the total pigs used in the experiment a total of 6.8% were removed for various reason. The morbidity and mortality rate totalled 8.4% and 6.2% for small and large groups respectively. Similarly, there was no difference in pigs taken off test due to tail bite incidences and the mortalities were not affected by the group size.

Finally, the data on carcass measures indicate no detrimental effects between the two group sizes for back fat, lean, predicted percentage lean or for dressed weight (Table 1).

The Bottom Line

Our results suggest, a slight reduction in growth rate for the entire grower-finisher period in pigs formed into larger groups. This depression in growth rate was severe immediately following large group formation, and no prolong effects on growth rate. ADFI was not affected by the large group size. We found no evidence of higher incidences of mortality and morbidity of pigs or increased variation in final body weights with pigs in larger group. In summary, the performance of the pigs in larger group size was not inferior to the smaller group evaluated in this study during the grower-finisher period. 

Continued from page 1

- Keep an adequate amount of fresh feed in front of lactating sows at all times.
 - Ensure feeders are designed such that feed intake is not restricted.
 - It is important to get sows onto full feed as quickly as possible especially for the shorter lactation periods (under 28 days).
 - Protein content and quality of lactation diet may influence feed intake. Sows eating diets containing 12-14% crude protein ate less than sows consuming diets of 16-18% crude protein. Increased protein levels also had a positive effect on piglet weaning weights. Protein diet concentration also improves conception rates and reduces days estrus.
 - The type of diet is also shown to have an effect on total feed consumed. Pelleted diets increase feed intake due to reduced feed spillage. It has also been shown that wet feed is more readily consumed than dry feed, therefore mounting the nipple drinker over the feeder may stimulate feed intake. Water management during lactation should ensure a flow rate of 2 L/minute from easily accessible drinkers. It is important to note however that wet feed should be removed regularly ensuring a clean supply of feed free from fermentation and or molds.
 - Environment also plays an important part in feed consumption in the farrowing room. It is important to ensure that a warm micro environment is available for piglets while the room, as a whole, is kept at a temperature low enough to ensure proper feed intake for the sow. Higher temperatures for a couple of days pre and post farrowing is required for the sow and piglets at this vulnerable time. After this the room temperature should be dropped to 18.5 -19.5°C
 - Increasing the number of daylight hours from 8 to 16, will increase feed intake, improve rebreeding performance, and result in higher weaning weights at 21 days of age.
- Large differences in sow productivity exist from one management system to another and may be due to a large extent on feed and feeding programs over a sow's reproductive lifetime. Proper feeding during gestation conditions the sow and enables her to manage feed intake during lactation resulting in a larger number of high weight piglets being weaned. Feed intake during lactation along with proper health care, and environment will also improve reproductive performance in subsequent litters, when considering farrowing rate and numbers born alive. 

Low Crude Protein Diets Reduce Nitrogen Output in the Manure, But Are They Practical?

A. Denise Beaulieu, Ph.D. and
John F. Patience, Ph.D.

Swine nutrition is becoming increasingly complex. Normally, a feeding program is developed to maximize the farm's return over feed cost. However, depending on the individual farm's circumstances, other issues, such as minimizing nutrient excretion into the slurry, may also be important.

Research at the Prairie Swine Centre and elsewhere has clearly shown that decreasing the nitrogen output in the manure can be achieved by feeding low crude protein (CP) diets. Over the past decade, synthetic amino acids have dropped in price, due to more efficient manufacturing practices, making low protein diets more economical. However, commercial application of this approach has met with some resistance due to fears that growth performance or carcass quality might be adversely affected. The reason for the poorer growth performance as well as reduced carcass quality observed in some studies is unknown. One hypothesis is that inadvertent changes in the energy content of the low protein experimental diets may be a factor. While other issues could be involved, the possibility of energy involvement is compelling.

The digestible energy (DE) or metabolizable energy (ME) systems of diet formulation fail to consider changes in the heat increment – that quantity of energy used for digestion and metabolism of the diet. Low protein diets reduce the need for energy for metabolism, because breaking down proteins and amino acids is an energy demanding process. Thus, diets formulated using the DE or ME system underestimate the quantity of energy actually available to the pig for growth when low protein diets are employed. The same occurs with low fibre diets, since fibre also increases heat increment. The NE (net energy) system takes the

heat increment into account, and is thus a superior system for feed formulation. While the NE system is widely employed in Europe, it is less commonly used in North America. However, the trend to feeding lower protein diets could accelerate the adoption of this system in Canada.

Another question that arises with the use of low protein diets is the acceptable level of synthetic amino acids in the diet. There are concerns that if such levels are too high, animal performance will suffer.

We conducted a very extensive experiment to address these two issues. We wondered if the use of the net energy system would allow us to maintain animal performance and carcass quality in low protein diets? Also, can we use higher than normal levels of synthetic amino acids and still maintain equivalent performance?

A three-phase split-sex feeding program was employed throughout; barrow and gilt programs differed in phases 2 and 3 only. The experiment compared three dietary treatments: a control program in which diets contained no more than 0.1% lysine, a low protein program that contained diets formulated to maximize synthetic lysine, methionine and threonine, but not tryptophan and a 3rd program that was intermediate between the other two. All diets contained wheat, soybean meal, barley, canola oil, and the appropriate minerals and vitamins. Synthetic amino acids were employed, as defined above, to maintain a constant lysine:DE ratio and minimum amino acid:lysine ratios across all treatments. For example, the low protein treatment for phase I was supplemented with 2.65 kg lysine, 0.74 kg threonine and 0.21 kg methionine per tonne. We also ensured that dietary electrolyte balance did not fall excessively in the low protein diets.

The energy, CP, lysine and methionine composition for all phases are presented in Table 1. This table clearly shows that when diets are formulated to contain equal concentrations of NE, the DE decreases when CP content is reduced.

Figure 1. The effect of finishing pigs on high, medium, or low CP diets on the days to market.

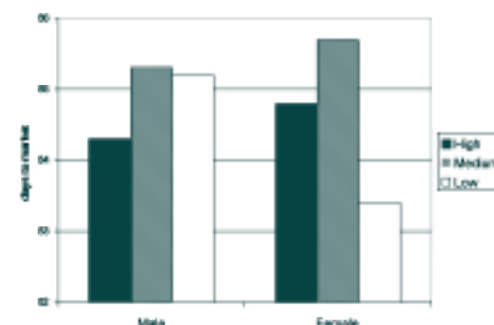
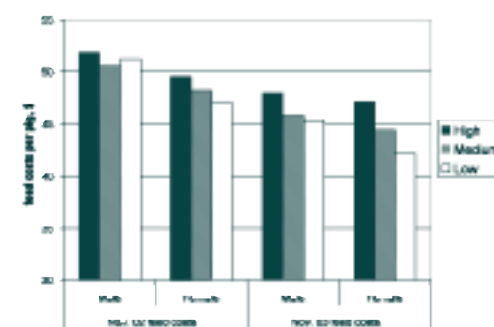


Figure 2. The effect of finishing pigs on high, medium, or low CP diets on the final feed costs per pig. Diets were priced using ingredient prices from November, 2002 (prior to the conduct of the experiment) and for comparison, using November, 2003 ingredient prices.



Conversely, if the diets had been formulated to a constant DE content, as the crude protein levels were reduced, net energy would have increased. This table therefore shows that formulating diets on the basis of DE can be misleading under such circumstances.

A total of 660 pigs (330 gilts and 330 barrows) were housed 22 to a pen, providing 0.65 m²/pig (7.0 ft²/pig), typical of commercial housing density. This experiment was conducted during the summer of 2002. Feed costs per pig marketed were calculated based on actual diet costs. Additionally, this calculation was repeated using the same diets but with November, 2003 ingredient costs.

Table 1. Energy, crude protein and amino acid content of experimental diets.

	TREATMENT					
	Male			Female		
	High	Medium	Low	High	Medium	Low
35 to 60 kg ¹						
Crude Protein, %	21.00	20.00	18.90	21.00	20.00	18.90
Lysine, %	1.07	1.05	1.03	1.07	1.05	1.03
Methionine, %	0.31	0.31	0.30	0.31	0.31	0.30
DE, Mcal/kg	3.40	3.37	3.33	3.40	3.37	3.33
NE, Mcal/kg	2.30	2.31	2.31	2.30	2.31	2.31
60 to 90 kg						
Crude Protein	18.80	17.90	16.90	20.00	18.50	16.90
Lysine	0.90	0.89	0.88	0.96	0.94	0.92
Methionine	0.28	0.28	0.28	0.30	0.29	0.29
DE, Mcal/kg	3.35	3.32	3.29	3.40	3.34	3.29
NE, Mcal/kg	2.33	2.33	2.33	2.33	2.33	2.33
90 to 115 kg						
Crude Protein	18.30	17.10	15.90	18.70	17.50	16.30
Lysine	0.82	0.80	0.79	0.86	0.85	0.83
Methionine	0.26	0.25	0.23	0.27	0.26	0.26
DE, Mcal/kg	3.28	3.22	3.16	3.33	3.28	3.23
NE, Mcal/kg	2.31	2.31	2.30	2.33	2.33	2.33

¹ Male and female pigs received the same diets in phase 1

Table 2. Effects of protein level and gender on pig performance by phase.

	TREATMENT					
	Male			Female		
	High	Medium	Low	High	Medium	Low
Animals on test	107	110	109	109	108	109
Phase I						
Days on test*	27.60	26.90	26.90	31.10	28.60	28.10
Ave. Daily Gain, kg.	0.943	0.922	0.964	0.934	0.913	0.911
Ave. Daily Feed, kg.	2.05	2.01	2.10	2.03	1.97	2.03
Gain:Feed	0.460	0.459	0.458	0.461	0.464	0.450
Phase II						
Days on test*	31.20	33.50	35.10	28.90	33.00	31.50
Ave. Daily Gain, kg.	0.949	0.949	0.962	0.926	0.919	0.934
Ave. Daily Feed, kg.	2.87	2.81	2.92	2.75	2.56	2.62
Gain:Feed	0.331	0.338	0.330	0.338	0.360	0.356
Phase III						
Days on test*	25.50	24.90	23.20	24.80	24.10	23.80
Ave. Daily Gain, kg.	1.037	1.055	1.027	1.016	1.021	1.023
Ave. Daily Feed, kg.	3.65	3.54	3.58	3.17	3.24	3.26
Gain:Feed	0.294	0.300	0.290	0.322	0.311	0.331

*Significant effect of treatment. Other parameters were not affected by the crude protein content of the diet.

Overall, performance was excellent, with growth rates averaging 959 g/d over the entire experiment. Feed conversion was also very good 0.359 (G:F), or 2.79:1 (F:G). The uniformity of performance was excellent, with a standard error of the mean for daily gain of only 8 g/d and for feed intake of only 25 g/d.

Table 2 describes the effects of CP content and gender on pig performance during each phase. There were no effects of treatment on ADG, ADFI or gain:feed in any period. It is very interesting that the pigs actually grew faster in Phase III (90 to 115 kg) as compared to Phase II (65 to 90 kg). This is unusual, as one would normally expect the rate of gain in pigs to decline during this final growth phase.

Days to reach market weight (115 kg) are shown graphically in Figure 1. Barrows and gilts

responded differently to the CP content of the diet. Females took fewer days to reach market weight when fed low CP diets, while there was no difference in males.

Carcass information is presented in Table 3. The effect of diet was statistically significant only for loin thickness, which favoured the low CP diet. However, feeding the low CP diet resulted in a numerical improvement in the carcass spread (loin minus fat), and premiums paid. There was no evidence of increased carcass fatness, something reported in other experiments. Otherwise, there were only the expected gender effects, with gilts indexing higher (111.9 vs. 109.7), having a higher lean yield (60.4% vs 59.2%), less backfat (19.1 mm vs 21.4 mm), a thicker loin (61.6 mm vs 59.0 mm), a wider spread between backfat and loin thickness (42.5 mm vs 37.6 mm) and earning

higher quality premiums (\$4.83 vs \$4.07). These gender effects are all within the expected range. The thicker loin on the low protein diet was unexpected and needs to be repeated before we can confidently conclude that this is indeed a real treatment effect.

Figure 2 describes the cost of feed per pig. The feed cost is

affected by feed intake, the days to market and the cost of the diet. Diets were least cost formulated at the time of the experiment in November, 2002. For comparison, we re-calculated the cost of these same diets using November, 2003 prices. Feed costs were less for the low CP diets. This was accentuated when diet costs were calculated using November 2003 prices. Relative to one year ago, the cost of soybean meal and lysine had increased, while the cost of methionine and threonine had decreased.

Nutritionists in the pork industry can have greater confidence in using much higher levels of synthetic amino acids. In this experiment, low protein diets, which supported performance equal to the normal protein diets, contained as much as 3.4 kg l-lysine HCl, 1.36 kg l-threonine and 0.4 kg of dl-methionine per tonne. The economics of growing pigs using low protein diets will depend on the cost of CP (ie. soybean meal), versus the cost of synthetic amino acids. Moreover, this experiment did not consider the potential savings due to the decreased nitrogen in the manure which could be significant for some producers.

Bottom Line

Low crude protein diets are practical for commercial production. Growth was unchanged and carcass was either unchanged or improved slightly. The economics of low protein and high synthetic amino acid diets is currently very favourable, saving \$2 per barrow and up to \$4 per gilt in this trial (based on November, 2003 prices).



Table 3. Effects of protein level and gender on carcass parameters.*

	TREATMENT					
	Male			Female		
	High	Medium	Low	High	Medium	Low
Settlement weight, kg.	88.60	88.70	88.70	89.54	88.84	89.50
Index	109.4	109.4	110.2	112.0	112.2	111.6
Lean yield, %.	59.22	59.00	59.32	60.36	60.54	60.24
Value, \$.	106.58	105.76	109.50	109.58	108.35	109.1
Fat, mm.	21.2	21.7	21.4	19.1	18.4	19.7
Lean, mm.*	58.1	58.6	60.4	61.6	60.0	63.1
Spread, mm.	36.9	37.0	39.0	42.5	41.7	43.3
Price, \$.	1.097	1.084	1.117	1.091	1.084	1.087
Premium, \$.	4.10	3.95	4.17	4.74	4.76	5.00

*Treatment effect was significant. All other parameters unaffected by crude protein content of the diet.



Feed Intake: Revisiting an Old Challenge

Reprinted from 2001 Spring Meeting Series

Lee Whittington, BSc., MBA,
Stéphane Lemay, Ph.D., P.Eng.

Feed Intake (FI) is among the most elusive of challenges stockpeople face to monitor and influence. This production-limiting problem is multi-faceted, farm specific, and time consuming to obtain measurable results. Feed intake is key to developing diet specifications, attaining target growth rates and has a significant impact on efficiency of production.

Surveys have shown that feed intake varies by at least 25 percent among commercial farms. This may in fact under-estimate the problem, since accurate data on feed intake is not readily available on many farms. Some of the data that is available, if estimated from long-term averages, or

for growing pigs is within 12-23°C, temperatures above this decrease feed intake, while temperatures below this range increase feed intake. Under high temperatures, feed intake is reduced approximately 40 grams for every 1°C above the thermal neutral zone. The problem of heat stress on pigs increases with bodyweight: each degree above thermal neutral zone reduces intake by 1% for 20kg pigs and 2.5% for 100kg pigs. Although we understand how this will slow growth rate, the impact on body composition has not been determined for pigs raised under hot conditions.

Recent studies at the Centre conducted by Dr. Lemay indicate that both feed intake and gain can be improved by approximately 6% when a summer strategy of lowering the setpoint temperature is followed. The research suggests that producers can offset the impact of low feed intake and gains associated with rising summer temperatures.

By adjusting the lower setpoint temperature 6°C below standard for the summer period, cool evening air can be used to lower room

temperatures (observed about 2°C) and increase feeding activity over the evening hours to compensate for reduced feed consumption during the day. Remember to reset the lower set point temperature back up to the standard setting in the fall.

Humidity and Ventilation Rates

The impact of relative humidity on swine performance is tied to the prevailing temperature and ventilation rate. The effect of high humidity on FI, ADG, and FE (feed efficiency) is more pronounced during periods of high rather than low ambient temperature. In a study with growing-finishing pigs (25 to 106 kg), average daily FI was significantly reduced when temperature was increased to 28°C at a relative humidity of 65 – 70%, the typical relative humidity in commercial barns. In the same study, increasing relative

humidity from 45 to 90% at a constant air temperature of 24°C caused a significant reduction in FI and ADG. High humidity severely minimizes the ability of pigs under heat stress to dissipate the extra body heat through evaporation.

Ventilation rate determines the effective temperature that the animal actually feels in winter, humid conditions combined with high airspeeds can create uncomfortably low temperatures for the animal although the thermostat setting may appear accurate. These conditions lead to increasing feed intake. Low ventilation rates leads to increased CO₂ levels and microbial proliferation and this adversely impacts on FI and ADG.

SOCIAL FACTORS

Space Allocation

Space restriction in pigs causes significant reductions in FI and ADG compared to adequate space allotment. Although space restriction causes reductions in FI and ADG in pigs, the magnitude of response relative to the level of restriction is quite variable. For instance, in one study a 36.7% reduction in space allowance for 18-55 kg pigs reduced FI and ADG by 11 and 18%, respectively while a 50% space reduction for young pigs (7.1-19.6 kg) reduced both FI and ADG by approximately 12%. At Prairie Swine Centre, Dr. Harold Gonyou using grow-finish pigs subjected to crowded conditions (approx. 24% space reduction) discovered that both feed intake and ADG were reduced. Furthermore, pigs subjected to space restrictions did not exhibit any compensatory gain upon being provided with additional space, increasing only to the level that was typical for their weight range.

The negative effects of exposing pigs to reduced space on ADG are not corrected by feeding pigs diets with high nutrient density. These observations suggest that reduced space leads to chronic stress that eventually impairs the efficiency of feed utilization. Moreover, space restriction in pigs may alter biochemical mechanisms and cause behavioral changes (e.g.

“Remember to reset the lower set point temperature back up to the standard setting in the fall.”

calculated on an inventory basis, fail to identify short-term deviations from this average.

Factors Affecting Feed Intake in Pigs

Various factors have been shown to influence Feed Intake in pigs. This includes such factors as the environment (temperature, humidity, heat radiation, and air circulation), social factors (stocking density, group size, regrouping, etc.), genetics, health status, feeding frequency, dietary nutrient density, and presentation of food.

ENVIRONMENTAL FACTORS

Temperature

Air temperature is the most studied environmental factor with respect to its impact on animal performance. Animals perform well within a certain temperature range referred to as the thermal neutral zone (or comfort zone). This range

increased aggression), which in turn diverts dietary energy away from being used for growth.

Regrouping

Regrouping strange pigs is commonly practiced as pigs move through a production facility. Mixing strange pigs leads to reductions in FI and ADG and this impact seems to persist even after pigs are re-united with their previous pen-mates. Based on these observations, we can conclude that market pigs should not be regrouped with strangers, 2 weeks before shipping. Regrouping 8-week-old pigs has shown not to have any long-term effect on production levels thus indicating that regrouping is a transient stressor that pigs can overcome if given sufficient time.

HEALTH

The health status of an animal is an important determinant of overall performance. In general, the immune system responds to the presence of pathogenic agents by synthesizing and releasing compounds known as cytokines, which in turn activates cellular and humoral components of the immune system. High activation of the immune system represents a form of stress (i.e. immunological stress) and pigs use physiological and behavioral strategies to maintain homeostasis during a disease challenge. During disease infection, potential anabolic hormones are inhibited and voluntary FI, ADG and FE are reduced from 5-24%. Recent research shows that pigs with activated immune systems have lower voluntary FI, FE, and body protein accretion compared to those with low immune system activation.

In addition to compromised FI and growth performance, disease infection also influences how animals use dietary nutrients for various body functions. Diseased animals exhibit a shift in the partitioning of dietary nutrients away from lean muscle accretion towards metabolic responses that support the immune system and also accelerates the breakdown of muscle proteins.

GENETICS

The genetic potential for gain varies with different genetic lines. Feed intake levels and FI patterns differ between pigs of divergent genetic lines. While such data is interesting, one must recognize that variations within a breed are often greater than among breeds. Pigs selected for faster gain exhibit higher FI levels compared to those with slow gain potential. In general, daily FI

level is directly related to the respective daily amounts of lean and fat deposited (about 3 to 4 times more energy is required to deposit fat compared to lean tissue) and the efficiencies for utilization of dietary energy for the accretion of body components. Pigs with a high potential for lean tissue growth tend to have a lower voluntary FI compared to those with low muscle accretion rate.



FEED

Feed Composition

Feed composition in terms of nutrient content and nutrient balance is an important determinant of FI in swine. In general, pigs consume feed to meet their nutrient requirement and therefore, the energy content of a diet has a great influence on FI. The pig has evolved to utilize a wide range of feed ingredients and although pigs can adjust their FI to compensate for low dietary nutrient density, the actual voluntary FI may be limited by the physical nature of the diet, is perhaps related to gut fill or passage rate before adequate nutrients are consumed.

Dietary crude protein content and the balance of dietary amino acids have also been shown to influence FI in pigs. Pigs fed on low protein diets or diets deficient in one or more essential amino acids respond by consuming more feed in an attempt to meet requirements for the limiting nutrients. Recently, varying Lysine:DE ratios were found to increase ADG in gilts but showed no effect on FI in either sex.

Feed Presentation

Feed intake in pigs is also influenced by the way feed is presented. Providing feed all the time is important. If feeders are empty or plugged for part of the day feed intake will suffer. Feeder ease of

adjustment is thus an important feature of feeder design. The feeder should allow easy access to the feed at all times, without the pig having to assume awkward positions to eat. Spending a few minutes in the barn watching pigs eat will determine how long they spend eating, how comfortable they are eating and whether feeder access is a problem. Feeder design can affect ad libitum feed intake by as much as 15-20%.

Offering feed in pellet form as opposed to mash form improves FI by 3-12%. The wide range of results has been explained by the fineness of grind. That is where feed is finely ground to make the pellet (avg. 450 microns in diameter) and this same feed is fed in mash form the difference attributed to pelleting is 3-5% improvement in intake. If however a coarse ground mash is compared to a finely ground feed that is pelleted, the differences would favour the pellet diet with 8-12% better FI.

Wet feeding increases feed intake by 6% compared to dry feeding over the grow-finish period (12 weeks). The largest part of this effect is seen in the late grower and finisher periods (weeks 5-12 in grower barn) where wet feeding improved ADG by 50 grams/day over dry feeding, and Feed Intake increased by 9% (250 g/da).

WATER

Pigs require at least two times as much water each day as feed by weight. Since water is required for swallowing and normal digestive processes, we can assume that if pigs are not drinking they are not eating. One functioning nipple drinker is required per pen of 12 pigs. Water flow rate is also important, and must be greater than 700ml/minute but no more than 1,500 ml/minute.

Take Home Message

Feed intake is one of the most important economic performance factors in pork production, and is continually influenced by several factors. The cost of poor feed intake varies among farms. Typically a 10% reduction in feed intake will result in pigs taking 2 weeks longer to reach market weight and require 15 kg additional feed, which represents about \$2.80 per pig. Slower growth is harder to place a value on, but is likely to be well in excess of \$2 per pig sold. Thus a 10% reduction in feed intake, typically attained under commercial production conditions, robs the bottom line of nearly \$5 per pig sold. The only way to manage feed intake is to measure it. 🐷

Cindy Jelinski

"It is very exciting to talk to people about the Pork Interpretive Gallery (P.I.G.). Working with something that is new is always fun – to watch it grow and evolve is very gratifying".

Raised on a mixed farm (sorry, no pigs though!) in Turtleford, SK. She is married to a veterinarian and they met while he was working for a hog operation! Together they established South East Veterinary Services in Moosomin, SK in 1985. After 7 years of mixed practice, they and their 3 daughters moved to Saskatoon, to Regina, and then back to Saskatoon.

Recently, Cindy was the office administrator at the Western College of Veterinary Medicine for an extensive research project – the Western Canada Beef Productivity Study.


We hit the ground running with the Grand Opening and the Pork Symposium. Both events made for a unique opportunity to meet a number of people in the pork



Cindy Jelinski

industry. As well, the tours to date have offered a chance to meet people across Canada and around the world!

Marketing of the P.I.G. is job #1. We are expecting to keep the tour guides very busy with the schools. And of course, there will be new displays planned too!

She is sure there will be a lot of exciting things happening at the P.I.G. in 2004! 

Banff Pork Seminar

Banff Centre
Banff, Alberta
January 20-23, 2004

Alberta Pork Congress

The Westerner
Red Deer, Alberta
March 17-18, 2004

Focus on the Future Conference

Red Deer Lodge
Red Deer, Alberta
March 30-31, 2004

Western Canadian Livestock Expo

Prairieland Park
Saskatoon, Saskatchewan
April 20-21, 2004

**To book a group tour or
find out more call
1-866-PIG-TOUR**


Edie Buckley

Edie Buckley joined the Prairie Swine Centre on July 9, 2003 in the position of Secretary. Residing in Saskatoon for over 17 years, Edie and her husband Richard spend most weekends at Coteau Beach on Lake Diefenbaker or enjoying their nine grandchildren.

Edie was raised on a mixed farm near Bounty Saskatchewan. She received her Business Administration Diploma from the University of Saskatchewan and later returned to update her computer skills at Saskatoon Business College. Before coming to the Prairie Swine Centre, she worked for the City of Saskatoon and the University of Saskatchewan, Department of Anesthesia. Edie is well known for her outgoing personality and contagious laugh.



Edie Buckley

She feels very blessed to be working with such a great staff at the Prairie Swine Centre and the opportunity it provides to meet so many interesting people. 



Centred on Swine is a quarterly newsletter produced by Prairie Swine Centre Inc. (PSCI).

Reproduction in whole or in part is prohibited without express written permission by PSCI.

Please send your cheque or money order to:

Lee Whittington, Managing Editor
Prairie Swine Centre Inc.
P.O. Box 21057, 2105 - 8th St. E.
Saskatoon, SK S7H 5N9 Canada

Subscription Rates
(includes GST):

\$32.00/1 year
\$61.50/2 years

Tel: (306) 667-PIGS (7447)

Fax: (306) 955-2510
www.prairieswine.ca

