Production Assessment and Improvements of a Newfoundland and Labrador Commercial Swine Herd

2012 - 2014

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Executive Summary

In the province of Newfoundland and Labrador (NL), pork production has seen a drastic decline of nearly 90 percent over the last two decades. With the closing of the provincial swine breeding operations, new genetic stock has not been readily available to producers. Additional problems have arisen, in the form of increased transportation and feed costs. Current producers seek to minimize expenses, while still producing a quality product in a minimal amount of time.

This project was initiated to evaluate performance of local stock and make comparisons to the progeny performance of imported stock. Three 'breeds' of pig were evaluated: Local, Landrace, and Yorkshire, under 2 diet treatments, Conventional and Bakery Wastes (at a 30% inclusion rate in a balanced ration).

Locally bred pigs were found to have the lowest maternal performance, with only 7.6 piglets weaned per sow per litter. Landrace and Yorkshire gilts had significantly higher numbers, with 11.5 and 10.8, respectively.

Rate of growth for the Local pigs was higher than that of the imported breeds under both diet treatments, and was thought to be primarily an indication of hybrid vigor of the offspring (an increased proportion of Duroc blood). Landrace preformed modestly better than Yorkshire, as breed characteristics would suggest.

Use of bakery wastes as an alternative feed source could reduce the feed cost per pig by up to $90.00. However, it should be kept in mind that all rations should be balanced by a professional. Using a feedstuff because it is free without consideration to how it will fit into the ration will result in decreased performance, economic loss, and potentially, health problems within the herd.

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Introduction

In the province of Newfoundland and Labrador (NL), pork production has seen a drastic decline over the last two decades. Numbers have decreased from an industry high of over 35,000 hogs and 25 producers to less than 200 breeding sows today and three producers with farrow to finish operations. These three producers struggle to maintain their herds. They raise, slaughter, process, and market their own pork. The NL Pork Producers Association has become defunct, and producers are no longer members of the Canadian Pork Council (CPC), the national organizational body.

In 1973, NL established strict regulations governing the importation of swine into the province to achieve Specific Pathogen Free herds. Since the closure of the West Coast and Central Swine Breeding Stations in 1991 and 1993 respectively, little has been done to ensure genetic viability of our current herds, nor has feed efficiency been measured. Additional problems have arisen with the end of the Feed Freight Subsidy Program. In grower-finisher operations, feed costs comprise 50-75% of operating costs (Lidster et al., 2009). With limited ability to grow grain rations for hog production here in the Province, increasing prices of grains throughout Canada and rising transportation costs, it has become increasingly difficult to develop cost efficient rations for the swine industry (Olesen and Honey, 2012).

This project was originally initiated as a pilot study to assess current production levels in one of these commercial operations, and to evaluate new genetic stock to be obtained from a different Maritime province. One method of controlling feed costs is through the use of Alternative Feeds. Many options have been explored throughout the world for the swine industry, such as French fry cuttings, culled fruit/vegetables, whey, restaurant wastes, fish processing wastes, seal meal, etc. (Kellems, 2002 and Westendorf, 2000).

Throughout the province, bakeries have to dispose of unmarketable products on a daily basis. Stale or spoiled breads, cookies, cakes, pastries, and other related products are termed bakery wastes. Bakery waste is considered an excellent alternative energy source when compared in terms of the industry standard source (corn). They are similar in terms of energy, protein and levels of limiting amino acids (lysine and tryptophan). Feeding levels of bakery waste are limited by salt content and levels of limiting amino acids (Hawkins et al., 2006). Additional problems may arise in nutrient level variation (dependent upon consumer demands each week), handling, storage, and incorporation into the diet. Maximum incorporation levels are at a 40% inclusion rate for grower-finisher hogs (Lackey, 2010).

One producer in NL has begun to experiment with the feeding of bakery wastes as a means of combating the rising costs of grains and total hog rations. However, he has experienced a number of challenges, and is unsure of the effects of using this alternative feed. Additionally, comparative feed efficiency measures have not been taken. As feed efficiency varies between breeds, age and sex, this is an important consideration in any feeding program (Bereskin, 1986). Comparison of bakery wastes to a conventional diet was an added component of this research to assess the cost effectiveness of utilizing bakery waste as an alternative feed stuff in the diets of growing swine.

Funding and Partnerships

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Methodology

In the summer of 2012, 10 purebred gilts (of varying ages) were obtained from Apple Valley Farms in Prince Edward Island: 5 gilts were Landrace, and 5 gilts were Yorkshire. From within the producers herd, 10 replacement gilts of Yorkshire-Landrace heritage were selected throughout the 2012 year. Gilts were of varying ages to better incorporate the animals into the breeder herd when old/poor sows were culled. Selected animals were marked with ear tags to identify them throughout the project. All selected and purchased gilts were raised on the farm under the same environmental conditions, and kept in the same sheds under identical management techniques. Table 1 lists ear tag and notched numbers of all gilts selected for this project. Yorkshire and Landrace gilts were ear tagged with the numbering system used at Apple Valley Farms. Local gilts were tagged based on order of selection into the breeding system. The first number denotes the year and order of selection (eg. Gilt 201 was the first replacement gilt selected in 2012).

Table 1. Gilts selected for the 2012-2014 research project.

Pig Identification Number	Breed
2711Z	Yorkshire
5761Z	Yorkshire
19344Y	Yorkshire
5492Z	Yorkshire
2895Z	Yorkshire
1633Z	Landrace
6091Z	Landrace
19165Y	Landrace
5223Z	Landrace
2753Z	Landrace
201	Local
202	Local
203	Local
204	Local
205	Local
206	Local
207	Local
208	Local
209	Local
210	Local

All breedings of the selected gilts were to a locally bred boar of Yorkshire-Landrace-Duroc heritage through natural mating. Gilts/sows farrowed in identical environmental conditions. Number of live births as well as all stillbirths and other deaths (crushing, weak piglets, etc) were recorded throughout the lactating period to assess maternal characteristics of the three breeds – Yorkshire, Landrace and Local.

Offspring were earmarked during piglet processing for future identification. Young animals were housed in identical groups until they reached the grower stage (approximately 25 kg of live body weight). At this time they were randomly placed in either the Control treatment (a conventional grain based diet) or the Bread treatment (a diet that utilized 20% of the total energy from locally obtained bakery wastes). The pigs fed a bakery waste diet were fed a 'hog stretcher' with a higher proportion of protein and lower energy. Pigs in the control group were fed a traditional hog 'grower' ration that was balanced for the nutritional requirements of a growing pig. The progeny were weighed bi-weekly throughout the project. Feed consumption was monitored (by group) throughout the project to assess feed efficiency of the growers.

Data collection was ongoing from October 2, 2012 (first gilt that farrowed) to February 15, 2014. Number of farrowings per gilt during this time period varied, based on age at purchase/age at selection, and occasional problems with rebreeding.

Results & Discussion

While all gilts were selected for the best possible replacement breeder potential, there were several animals that had production issues. Some were minor, such as a longer than average rebreeding time, but others were much more serious.

Within the Yorkshire gilts, number 5761Z had 2 false pregnancies. Despite being due to farrow in both September 2013 and January 2014, she did not have a single litter throughout the course of this project. She was culled January 2014.

Within the Landrace gilts, two promising sows were culled without producing a litter. 5223Z was euthanized after getting a leg infection that would not heal despite antibiotic use in September 2013. 2753Z was culled after aborting her first litter and having a false pregnancy for her second in October 2014.

Within the local gilts, 201, 204, 208, 209 and 210 were culled for various reasons. 201 and 204 had leg injuries in (December 2012 and February 2013, respectively). 208 and 210 had excessive stillbirths and/or crushing deaths and were culled August 2013. Gilt 209 had 2 false pregnancies and was culled December 2013. While the producer believed these losses to be abnormally high, it highlights the value of both record keeping and maintaining stock of good genetic background.

Litters from the Yorkshire and Landrace gilts exceeded expectations and are summarized below:

Table 2. Farrowing averages and associated losses by breed.

Breed	Farrowed	Weaned	% Stillbirths	% Deaths
Yorkshire	14.9	10.8	14.8	11.4
Landrace	13.0	11.5	8.4	5.4
Local	10.2	7.6	14.0	10.3

It is evident that both imported Yorkshire and Landrace gilts exceeded those from the Local herd in terms of total piglets farrowed and total piglets weaned. Yorkshire gilts had heavier losses from both still births and piglet deaths (such as crushing, chills, etc), while Landrace had the lowest losses. This would indicate that the maternal genetics of the Landrace were superior to both the Yorkshire and Local gilts, despite not farrowing as high a number of piglets (when compared to Yorkshire).

Weight at weaning was recorded for all surviving progeny prior to being placed in group housing. Weaning age was usually 25 days, but ranged from 24 to 28. Variations in weaning weight were minimal across Breeds, with the average weaning weight found to be 8.19 kg. All animals were fed an identical starter diet until an approximate body weight of 25 kg was reached. Growers were then separated into individual treatments for the duration of this project. Weights were taken bi-weekly of all progeny. Figure 1 demonstrates the average growth of the barrows and gilts. The treatments listed are Yorkshire-control (Y-c), Yorkshire-bakery wastes (Y-b), Landrace-control (La-c), Landrace-bakery (La-b), Local-control (Lo-c) and Local-bakery wastes (Lo-b).

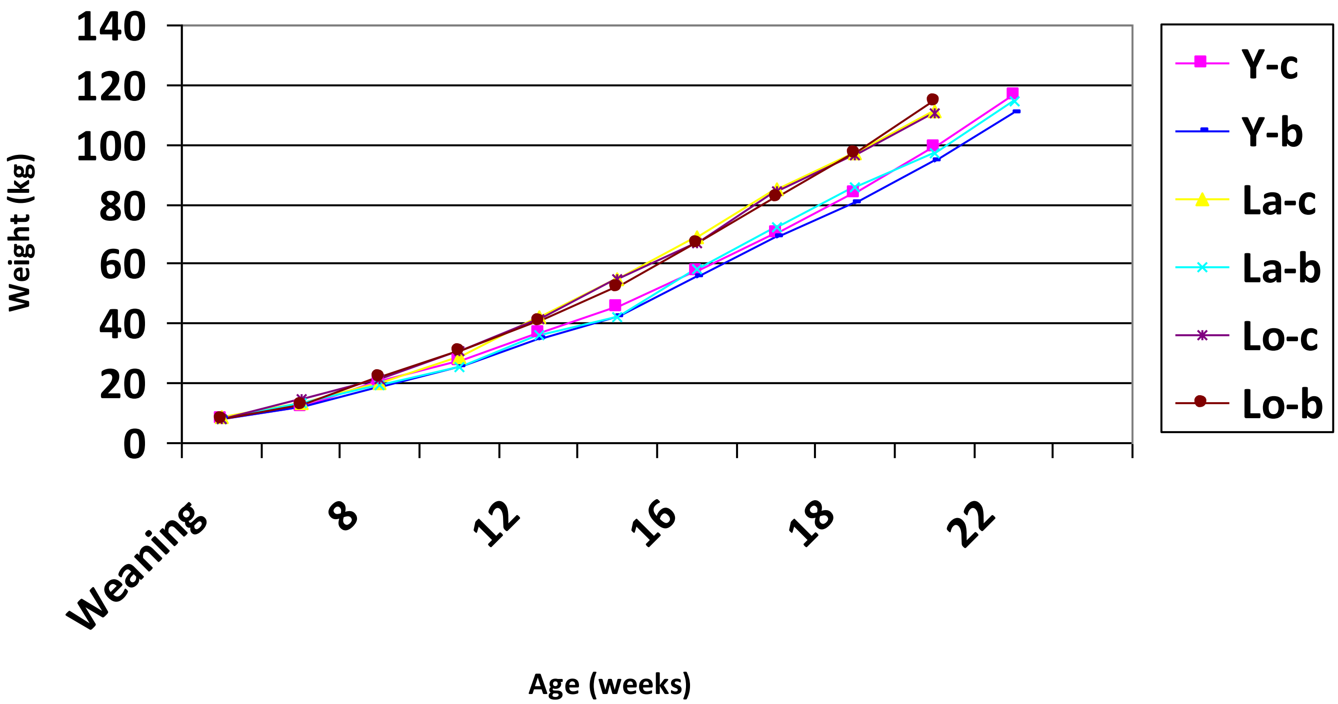

Figure 1. Growth chart of progeny in all treatments (2012-2014).

Figure 1 illustrates the comparative growth rates of the treatments used during this trial. Fastest rates of gain were seen with the Local treatments (Lo-C for control and Lo-B for bakery wastes). Slowest rates of gain were seen in the Yorkshire pigs. Breed differences are attributed to account for much of this variation. Locally raised pigs are heavily outcrossed pigs with a significant amount of Duroc breeding (a meat breed of pig). Progeny from the Yorkshire and Landrace gilts would be less than 1/16 Duroc. As both Yorkshire and Landrace are predominantly maternal breeds of pig, their rate of gain would be expected to be lower.

When looking at overall difference in rate of gain of the Bakery treatments compared to those of the Control treatments, diets that contained bakery waste tended to have a slower comparative rate of gain.

Overall, progeny fed a diet supplemented with Bakery wastes were marketed 2 weeks later than those fed a conventional diet (168 days vs. 154 days). This may be a result of increased competition for the bakery waste products (bigger pigs eating too much, while smaller pigs not receiving enough).

Despite a slightly slower growth rate achieved when feeding Bakery wastes, costs to raise a grower on this alternative feed source were significantly lower. Feed costs to raise pigs to the grower stage were averaged across all treatments and were found to be approximately $26.12 per piglet. After separating into individual treatments, comparative costs of feed varied greatly. Table 2 summarizes feed consumption costs (per pig) by treatment group:

Table 3. Summarized feeding costs (per pig) during the grower stage (25 kg - slaughter).

Treatment	Grower Feed Cost (per pig)
Yorkshire – Bakery Waste	138.20
Yorkshire – Control	230.56
Landrace – Bakery Waste	127.65
Landrace – Control	220.94
Local – Bakery Waste	125.26
Local – Control	218.11

Table 3 illustrates significantly decreased costs of raising growers on a bakery waste diet. Each breed was found to be approximately $90 less to raise a pig on an alternative diet than on a traditional diet. This is very promising, as grain and transportation costs have risen significantly in the last 2 decades.

It should be cautioned that these feed costs for grower pigs were calculated on the assumption that bakery wastes were free. This may vary by supplier, availability, and proximity to the farm. For example, if a producer must drive 2-3 hours away from the farm to pick up the bakery wastes, the transportation costs may outweigh the benefit of utilizing this feedstuff. As well, there is a labour component associated with using bakery wastes, including collecting, un-bagging, sorting (to remove spoiled feed) and freezing. It also requires more intensive handling to physically feed the grower pigs.

Conclusions

While there were a number of conflicting results within this experiment, a number of conclusions may be drawn from the data. Foremost is that the inclusion of bakery waste in the grower-finisher may greatly reduce feeding costs. Producers could save over $90.00 per pig when raising growers with bakery wastes incorporated as the energy component of the diet.

We also have learned that Local pigs, despite being bred from a limited gene pool in the last 15 years, are excellent in terms of feed conversion to muscle. Of the 3 ‘breeds’ of pig examined, the Local type had significantly faster growth rates in both diet treatments. While this may be due, in large part, to hybrid vigor of their genetic background, it is of great importance when considering potential new breeding stock to complement existing characteristics of the herd. Unfortunately, after multiple generations of having a closed herd, reproductive characteristics have been shown to be poor. Of an average 10.2 total number of piglets born per sow, Local gilts had the lowest piglets weaned per sow, at a total number of 7.6. Of the 10 gilts chosen for this study, 5 gilts were culled, because of either health issues or poor maternal characteristics.

Yorkshire, a primarily maternal breed was evaluated during this study. Only one pig was culled with no production records. These pigs also had the highest farrowing rate (14.9), but unfortunately also had high corresponding stillbirths (14.8%) and other pre-weaning losses (11.4%). However, both feed treatments of Yorkshire piglets (conventional and bakery waste) showed the lowest growth rates among progeny. Again, this may be due, in large part, to being primarily a maternal breed of pig, not known for the greatest gain rate.

Landrace pigs showed a great deal of promise, despite the early losses of 2 gilts. Gilts had the highest piglet survival numbers (an average of 11.5 piglets weaned per sow), and lowest rates of still births (8.4%) and other pre-weaning losses (5.4%). Growth rate was slightly lower than in Local pigs, but higher than that of the Yorkshire pigs. This may be attributed to genetic characteristics of the breed, as Landrace pigs are known for both maternal characteristics and excellent feed conversion rates.

It is suggested that producers record and closely monitor maternal characteristics of their gilts and sows. Simply coming from a good mother is not grounds to keep gilts, as leg issues, or reproductive issues may surface at a later date. It is also evident that new genetics be introduced to the herd on a regular basis, as line-breeding or in-breeding will eventually result in decreased performance.

Feed is generally the greatest single cost when raising livestock. It is recommended that producers try alternative feedstuffs to decrease these costs. Bakery waste has been shown to be a cost friendly, effective method of achieving this. However, it should be kept in mind that all rations should be balanced by a professional. Using a feedstuff because it is free without consideration to how it will fit into the ration will result in decreased performance, economic loss, and potentially health problems within the herd.

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