

TRANSMISSIBLE GASTROENTERITIS (TGE)

Prairie Swine Centre's Experience

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TABLE OF CONTENTS

1. Summary	1
2. Background	1
2.1. Prairie Swine Centre Inc.	1
2.2. Transmissible Gastroenteritis	1
3. Chronology of Events	3
4. Diagnosis	3
5. Impact on Performance and Productivity	4
5.1. Breeding Herd	4
5.2. Weanling Pigs	6
5.3. Growout	7
6. Response to the Outbreak	8
6.1. Acute Response	8
6.1.1. Feedback Procedures	8
6.2. Impact on Staff and Family Members	8
6.3. Review of Biosecurity	8
6.4. Financial Response	8
7. Economic Impact	9
8. Conclusions	10

Acknowledgements

The impact of disease on a swine production unit is felt in many areas of the business. Of course the disease will decrease herd productivity, but the extent of the damage goes well beyond the current productivity and beyond the pigs. Barn workers who work daily with animals they like to maximize productivity, are suddenly faced with a high level of mortality over which they have no control. In human terms, the effect is traumatic!

Transmissible Gastroenteritis (TGE) is manifested by a sudden onset of symptoms and death. The viral nature of the disease means there is little an animal care giver can do to save young stock. It is our hope that this publication will provide the reader with a more comprehensive understanding of what to expect when faced with this disease. This, in turn, will make the disease more tolerable.

The authors wish to acknowledge the role of the production staff at the Centre who persevered throughout this period, maintaining meticulous records so that we may be able to share the details of our TGE break with you. Their records, observations and suggestions make up the bulk of this report.

We also wish to acknowledge the contribution of Janice Cruise who assisted with the publication of this report.

Our Funding Partners

The Prairie Swine Centre Inc. exists as a testament to the hard work and cooperation of many supporting groups. It is the continuous support of the pork producers of Western Canada that makes the research and technology transfer programs possible. We want to acknowledge the financial contributions of:

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1. SUMMARY

On March 28, 1995, the first clinical symptoms of what would later be diagnosed as TGE were observed in the growout area of the Prairie Swine Centre. Symptoms continued in various parts of the barn for about 4 weeks. In total, 426 piglets died from TGE, 16 sows were culled for reasons directly associated with TGE and subsequent litter size of retained sows was reduced by about 0.7 pigs. Nursery pigs suffered reduced performance for about one week and older pigs for about 2-3 weeks. Overall, age at market weight increased by about 10 days. The gross cost of the TGE outbreak was estimated at about \$66,000. Extra mating of gilts helped to offset this cost, but the final net tally was estimated at more than \$37,000.

2. BACKGROUND

2.1. Prairie Swine Centre

Prairie Swine Centre Inc. is a non-profit corporation involved in research, education and technology transfer, all directed at efficient, sustainable pork production. It operates Canada's largest swine production research facility, encompassing more than 77,000 ft² of total floor space. Three breeding barns, two containing 105 sows (gestation, lactation and nursery) each and one containing 70 sows (gestation, lactation and nursery), were built in 1980. In 1992, a new Grower-Finisher Research Unit was added to allow the Centre to finish all production on-site. The new facilities linked the two larger sow barns; this was significant from a biosecurity perspective, as staff no longer have to go outside to move between the two barns. However, it is still necessary to go outside to reach the smaller sow barn, as well as a smaller feeder barn.

Due to its close association with the Western College of Veterinary Medicine, the health status of the Centre's herd is reasonably well-defined. It is positive for parvovirus, *strep. suis* (Type IX). The herd is free of infectious respiratory diseases, including atrophic rhinitis, *actinobacillus pleuropneumoniae* and mycoplasma pneumonia. The herd is free of swine dysentery and of PRRS. It is also free of internal and external parasites. Prior to the TGE outbreak, the Centre was selling 22 pigs/sow/year and operating a very active research program, with one new experiment starting on average approximately every 6 days.

Biosecurity has a high priority at the Centre, due to the recognition that disease would have a major impact on production as well as on research. It is also recognized that the number of staff, students and visitors, which typically ranges from 12 to 35 on a weekday, is much greater than on a commercial farm and thus exposes the Centre to greater risk. The quantity of materials and equipment entering the barns, in support of various research activities, is also much greater than on a commercial farm.

No live pigs are allowed into the herd, other than those derived by Caesarian section. All visitors to the Centre's animal facilities must shower before entry and as much as possible, materials entering the barns must be either new or cleaned prior to entry. Vehicles delivering pigs to the abattoir or to other animal facilities are power washed before returning to the Centre; the staff member responsible for trucking is a permanent outside worker and does not enter the animal buildings.

The closest neighbour with pigs is located more than 3 km away; this neighbour has only a few sows and young pigs. The closest commercial pig farm is more than 10 km away. Highway 16, a major thoroughfare employed by trucks hauling live hogs into Saskatoon passes within 1 km of the Centre.

2.2. Transmissible Gastroenteritis

Transmissible gastroenteritis is a highly contagious enteric disease of swine. Caused by a coronavirus, it results in severe diarrhea, vomiting, depressed appetite and, in newborn piglets, an extremely high level of mortality. Although pigs of all ages, from newborns to adults, are affected by the virus, symptoms are most pronounced in the very young. Because the disease is highly contagious, it can spread throughout a barn in a matter of a few days.

The incubation period of the disease is short, in the order of 1 - 2 days and the spread of the disease throughout a room of pigs will normally be complete within 3 - 5 days. The virus probably spreads through both oral and respiratory routes. The rapid spread suggests that it travels well through the air, at least within the confines of the barn. While all infected animals shed the virus readily via the faeces and nasal secretions, lactating sows may also infect their piglets via their milk.

The coronavirus responsible for T.G.E. appears to be highly host specific. While the virus has been recovered from the faeces of dogs, cats, foxes and starlings, clinical symptoms were not observed. Following artificial infection, the virus has been observed to be shed in the faeces of dogs over a two week period.

The virus is resistant to freezing, but susceptible to common disinfectants such as formalin & phenol as well as heat. It is photosensitive, meaning that exposure to light will kill the virus. These characteristics of the virus, such as resistance to freezing and susceptibility to sunlight and drying, may explain in part why TGE is more commonly observed in the winter and spring months. The organism will not persist in infected premises - outside host animals - for more than a few weeks. In infected pigs, the organism will normally be shed for only a few weeks, but may be harboured in the intestinal tract or lungs for 3 months or more.

In some herds, the disease becomes endemic, with a low level of continuous infection resulting in sporadic appearance of symptoms. Such cases are generally associated with partial immunity, a low virulence form of the organism and continuous flow farrowing facilities.

Outbreaks of the disease are explosive and dramatic. Typical early symptoms are sudden vomiting, watery diarrhea and rapid weight loss. Following ingestion, the virus is able to withstand the highly acidic conditions of the stomach and passes into the small intestine where it attacks the cells of the villi, primarily in the jejunum and ileum, which is notable as this is the portion of the gut where nutrient absorption is normally greatest.

Damage to the cells of the intestinal villi results in poor digestion of food and greatly impaired absorption of water, electrolytes and other nutrients. Diarrhea results from poor absorption of water and also by the presence of the unabsorbed food in the intestinal tract. In nursing piglets, the watery stool contains small curds of undigested milk. Because the intestinal lining is severely damaged, young pigs which do survive are likely to remain unthrifty for an extended period of time and may never fully recover. Older pigs, those weaned and beyond,

appear to suffer only transient reductions in performance and grow well after recovery.

In piglets under 2 weeks of age, most individuals are affected and mortality is very, very high. In a given outbreak, mortality in suckling pigs will approach 100% for a period of 2 to 3 weeks, so that total piglet loss will range from 1.3 to 2.0 pigs per sow in inventory. Thus, a 100 sow unit might expect to lose 130 to 200 pigs! The impact of the disease is generally inversely related to age; market hogs experience transient diarrhea and depressed appetite and, in some instances, vomiting; mortality is rare. Sows and boars also experience diarrhea and poor appetite; however, vomiting is much more common, especially in lactating sows. Sows nursing infected litters may become very ill, showing signs of lethargy and a high body temperature.

The disease typically runs its course in 2 to 5 weeks, as infected pigs die and immunity spreads throughout the rest of the herd. Generally, the disease will not recur in the same herd again for 3 to 5 years, although there is some optimism that the disease can be fully eliminated from the herd by following certain practices during and immediately following the original outbreak.

TGE is generally diagnosed on the basis of unique clinical symptoms, confirmed by laboratory tests on selected tissues. For example, the rapid onset and acute nature of TGE, with high mortality and vomiting, differentiates this disease from most other forms of diarrhea. The fact that it affects both piglets and sows is also an important clue. In the pathology lab, the thinning of the intestinal wall, the presence of yellow, curdled fluid in the intestinal tract and the presence of a rather unique stomach lesion are also important signals. Villus atrophy observed under the microscope is symptomatic of TGE. However, one or more positive laboratory tests are the only definitive diagnosis for TGE. The FAT and immunoperoxidase test are the two most commonly used laboratory tests. The virus may also be observed in the faeces under the electron microscope. Serological testing may be useful in identifying herds that have been exposed to the virus. However, interpretation may be difficult because of cross reaction with porcine respiratory coronavirus (PRCU).

3. CHRONOLOGY OF EVENTS

Following is a calendar of events related to the T.G.E. outbreak at the Prairie Swine Centre:

- | | | | |
|----------|--|---------|--|
| March 28 | First symptoms of reduced feed intake, diarrhea observed in one growout room in the south wing of the Grower-Finisher Research Unit (GFRU). Pigs were about 125 days of age. Otherwise, pigs appeared normal, were not lethargic or droopy. Visually, other than the diarrhea, the pigs appeared quite normal. However, feed intake was clearly reduced. | April 1 | Symptoms first appear in the farrowing room, in piglets that were 3 days of age. Of course, this occurred on a weekend! |
| March 29 | Two more rooms, close to the first, broke with same symptoms. | April 2 | The two growout rooms immediately adjacent to the first room broke with the same symptoms. |
| March 30 | Another growout room broke; this one in the east wing, but very close to the first room to break in the south wing. These pigs were 13 weeks of age. | April 4 | All remaining rooms in the growout area were now affected; within 7 days the virus had moved into 15 different rooms in growout!

Symptoms occur in the nursery for the first time. Pigs were 4 or 8 weeks of age at the time of the break.

Second farrowing barn and related nursery rooms hit by the virus. In the 3 rooms in the nursery, pigs were 5, 6 and 7 weeks of age, respectively. |
| March 31 | Three more rooms in the east wing broke. Pigs ranged in age from 9 to 20 weeks. | April 5 | Symptoms first appear in the gestation area. |
| | | April 7 | Gestation associated with the second farrowing barn affected. |
| | | April 9 | Diagnosis confirmed. Feedback procedure initiated. |

4. DIAGNOSIS

The initial clinical signs presented in the TGE outbreak occurred in one grow/finish room; the herdsman reported mild, transient diarrhea lasting 48 to 72 hours. Affected pigs were only mildly depressed. Feed consumption was reduced. Each day new and different pigs seemed to be affected. This illustrates that while TGE is commonly associated with mortality in piglets, its first entry into the barn can occur in any area.

Initially, feed was suspected as the possible cause of the problem, due to the nature of the clinical symptoms and the fact that it affected only one room. Thus, feed samples were saved. However, after about three days, additional rooms were involved and feed was clearly not the cause. At this point, we suspected that TGE was a possibility.

Blood samples were taken from affected pigs along with faecal samples. No deaths or serious illness had occurred to this point.

Within 5 days of the initial outbreak, there were sick nursing piglets in the farrowing rooms. The very young piglets had severe diarrhea and some vomiting; the scours did not respond to antibiotic treatment.

As soon as piglets became sick, several were sacrificed for necropsy and a full virological work up for TGE was performed. The diagnosis of TGE was confirmed by two different tests on the intestinal tissues of the affected piglets. The first test was the FAT (florescent antibody test) which is a commonly used test, but sometimes difficult to interpret. The second test was the immuno-

peroxidase test. This test is more specific for TGE and can be done on both frozen and formalinized tissues. Both tests were strongly positive.

It is important to note that not all the piglets submitted were positive. This is why it is important to submit more than one sample; preferably at least three cases should be submitted. It is also very important to submit animals in the very early stages of the disease, ideally less than 24 hours since showing the first signs.

Pigs from the grow/finish barn were re-bled about 10 days after being affected. The blood was tested for TGE antibodies. We were able to show the early blood samples were negative for antibodies, while these samples showed high antibody titres to TGE, indicating that they had recently been infected and developed an immune response.

The piglets and fecal samples were tested for a number of other organisms including salmonella and rotavirus. These tests were negative.

5. IMPACT ON PERFORMANCE AND PRODUCTIVITY

Overall, total mortality attributed to TGE was 426 head; this is equivalent to approximately 1.5 piglets per sow in inventory, and thus within the "normal" range. However, losses extended beyond piglet mortality, as weanling pigs and market hogs suffered a transient loss in performance and subsequent litter size in affected sows declined.

The following sections attempt to quantify the losses in performance and productivity observed at the Centre. With the intensive record keeping in place, combined with the fact that most of the weanling pigs and market hogs were on experiments, it was possible to compare the performance of animals during the outbreak with that recorded prior to and subsequent to the

presence of clinical symptoms of disease (i.e. diarrhea, depressed appetite). "Before and after" comparisons must always be conducted with great care, because there is no control against which to compare results. However, the current outbreak offered a unique opportunity to quantify some parameters which might be difficult on a commercial farm; in particular, the impact on weanling pigs and growers was of greatest interest.

5.1. Breeding Herd

In order to estimate the impact of TGE on the performance of the breeding herd, we focused our attention on litters farrowed during the 8 weeks prior to the break, the 5 weeks during the break and the 8 week period after the break. This provided a basis for comparison that encompassed 243 litters and 2,921 piglets.

The data in Table 1 summarizes selected farrowing parameters for these litters, in comparison to the established production goals for the herd. Prior to the outbreak, the herd averaged 10.8 litters farrowed per week, slightly below the goal of 12.0; the fiscal year (July 1, 1994 to June 30, 1995) average for the herd was 12.2 litters farrowed per week. During the 5 week period during which TGE symptoms were observed in one or more farrowing rooms, the herd farrowed an average of 11.8 litters per week. After the break, farrowing averaged 12.1 per week. TGE clearly had no effect on the number of litters farrowed, which is to be expected since the virus does not cause abortion or increased stillbirths.

In terms of litter size, the goal set for the herd was 10.9 pigs born alive. Prior to the break, the unit averaged 11.8, during the break it averaged 10.6 and after the break, it averaged 11.1. Clearly, TGE had no impact on the number of pigs born alive per litter. Furthermore, TGE had no impact on the stillbirth rate, which remained essentially constant for this period. Again, this is not surprising, given the etiology of TGE.

Table 1. Comparison of farrowing results for the periods prior to, during and after the T.G.E. outbreak

Period	No. Farrowings	Total Born	Total Born Alive	Ave. Born/Litter	Ave. Born Alive/Litter	% Born Alive
<i>Goal</i>	<i>12.0</i>				<i>10.9</i>	
Before ¹	87 (10.8) ⁴	1089	1028	12.5	11.8	94.4
During ²	59 (11.8)	676	629	11.4	10.6	93.0
After ³	97 (12.1)	1156	1074	11.9	11.1	92.9

¹ Includes farrowing during the 8 week period prior to when T.G.E. symptoms were observed.

² Includes farrowing during the 5 week period when T.G.E. symptoms were observed in one or more farrowing barns.

³ Includes farrowing during the 8 week period after T.G.E. symptoms were observed.

⁴ Total litters farrowed (ave. no. of farrowings per week).

Table 2. Comparison of weaning results for the periods prior to, during and after the T.G.E. outbreak

Period	No. Litters	Total Weaned	Ave. Litter	Age at Weaning, days	Post-Weaning Mortality ⁴
<i>Goal</i>			<i>9.6</i>	<i>21</i>	
Before ¹	87	922	10.7	20.3	1.7
During ²	59	359	6.3	12.1	36.2
After ³	97	964	9.9	20.3	0.7

¹ Includes litters farrowed during the 8 week period prior to March 21.

² Includes litters farrowed during the 5 week period from March 21 to April 24.

³ Includes litters farrowed during the 80 week period after April 24.

⁴ Because many litters were weaned early during the T.G.E. outbreak, total post-weaning mortality (% of number weaned) is used for comparison purposes.

The greatest impact of TGE is on the newborn piglets, which are highly susceptible to attack by the pathogen. These results are presented in Table 2.

The number of pigs weaned per litter dropped from 10.7 prior to the break, to 6.3 during the break. It then recovered to 9.9 after symptoms of TGE disappeared from the herd. The number of pigs weaned per litter is misleading, however, as many sows were weaned very soon after farrowing and many of these early-weaned piglets succumbed to the virus. Thus, total postweaning mortality (nursery + growout) increased from 1.7% prior to the break to 36.2% during the break; later, total postweaning mortality declined to less than 1%.

Within individual weeks during the break, postweaning mortality was as high as 72%. Within an individual farrowing room, mortality approached 100%, as almost all pigs affected early in life (i.e. < 7 days of age) died or became extremely ill.

Subsequent reproductive performance was affected in those sows bred during or shortly after the TGE outbreak. In an attempt to quantify the impact of TGE on subsequent reproductive performance, the subsequent reproductive performance of sows weaned during the 6 week period prior to the outbreak were compared with those weaned during the 5 week period of the outbreak and the 6 week period after the outbreak (Table 3).

Table 3. Comparison of subsequent reproductive performance of sows weaned prior to , during or after the outbreak

Period	Days to 1st Heat	Days to Mating	# Culled Due to TGE	#Born Litter	# Born Allive/Litter	# Weaned/ Litter
Before ¹	5.5	6.7	0	12.0	11.1	10.3
During ²	15.5	19.3	16	11.3	10.6	9.4
After ³	5.4	5.8	0	12.5	11.4	9.9

¹ Includes sows weaned during the 6 week period prior to the TGE outbreak.

² Includes sows weaned during the 5 week period during the TGE outbreak.

³ Includes sows weaned during the 6 week period following the TGE outbreak.

It is clear that TGE resulted in an increased weaning to rebreeding interval and somewhat smaller subsequent litters size. It is not possible to determine if these results are due to reduced performance of the sows, or the boars, or both.

5.2. Weanling Pigs

It was possible to look at the performance of weanling pigs prior to, during and subsequent to the presence of clinical symptoms (eg. diarrhea) associated with the TGE outbreak. While the exact impact of the disease is difficult to quantify precisely, this procedure provides a reasonable estimate of the impact of TGE on weanling pig performance, at least in the instance of this particular outbreak.

Prior to and after the outbreak, pigs were growing at an average 527 grams/day (Figure 1). In the week when clinical symptoms were present, average daily gain declined to 263 grams/day, a reduction of 50%. These results are consistent with what you would expect from TGE, given that the intestinal tract is one of the primary sites of attack. A more complete picture emerges from the data on feed intake, which declined from 741 grams/day to 645 grams/day, a reduction of only 13% (Figure 2). Clearly, reduced appetite was not the only problem, as growth rate declined much more than feed intake.

EFFECT OF TGE ON WEANLING PIGS (A.D.G)

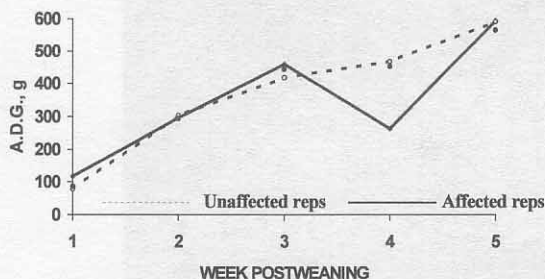


Figure 1.

EFFECT OF TGE ON WEANLING PIGS (A.D.F)

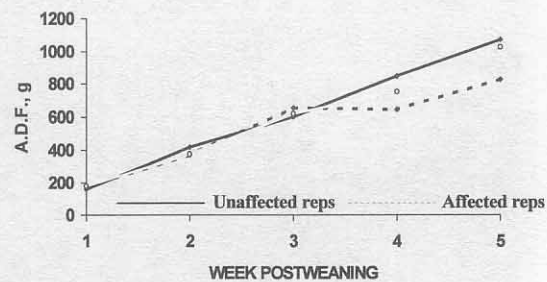


Figure 2

As illustrated below, feed conversion declined from 1.41:1 to 2.45:1, a difference of 74% (Figure 3). This is consistent with what one would expect from TGE; lethargy associated with the viral infection resulted in depressed appetite, but physical damage to the gut meant that nutrients consumed were used with much less efficiency than would otherwise be the case. This would likely be due to damage to the gut, resulting in poorer digestion and absorption, combined with the increase in nutrients required by the animal to fight infection.

EFFECT OF TGE ON WEANLING PIGS (Feed:Gain)

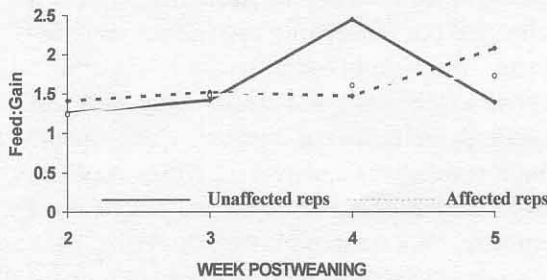


Figure 3.

Perhaps the most interesting aspect of these results is the relatively transient nature of the illness; these pigs recovered more rapidly than the pigs in the growout area. Indeed, reduced performance appeared to only be experienced in the nursery for about one week!

5.3. Growout

One room of 80 pigs were growing at about 1,007 grams per day, averaged prior to and after the outbreak; during the two week period when clinical symptoms were the most severe, average daily gain declined to an average 527 gram/day, a reduction of 48%. However, performance seemed to be affected for between two and three weeks in total. Average daily feed also declined 24%, from 3,053 gram/day to 2,316 gram/day. Feed conversion increased from 3.02 to 4.39.

IMPACT OF TGE ON A.D.G. (Init. Wt. = 84.1 kg)

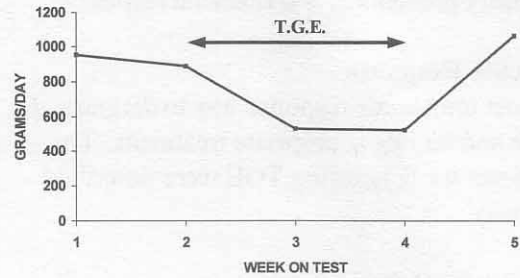


Figure 4.

IMPACT OF TGE ON FEED CONVERSION (Init. Wt. = 84.1 kg)

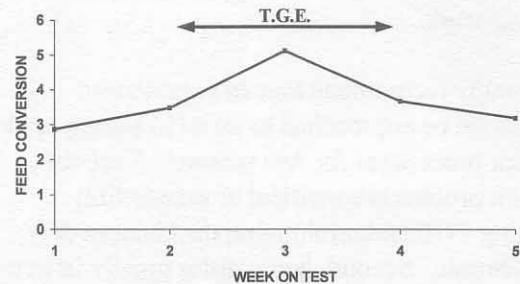


Figure 5.

IMPACT OF TGE ON A.D.F. (Init. Wt. = 84.1 kg)

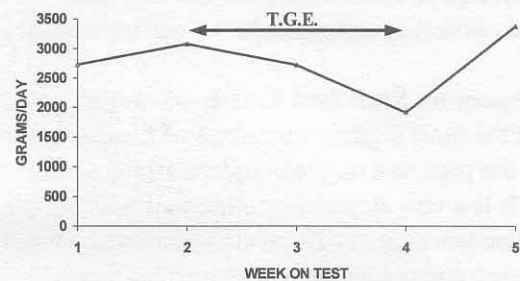


Figure 6.

6. RESPONSE TO THE OUTBREAK

The response by the staff of the Centre can be divided into four components: acute response, impact on staff and family members, a review of biosecurity procedures and financial response.

6.1. Acute Response

The most immediate response was to diagnose the disease and initiate appropriate treatment. The procedures for diagnosing TGE were described previously.

6.1.1. Feedback Procedures

Once the disease was diagnosed, feedback procedures were initiated immediately. This is a crucial step, because it is so important to achieve a high level of protective immunity throughout the whole herd all at the same time. Otherwise, there is the risk of the disease becoming chronic, a situation which is much more difficult to address than the acute outbreak.

We strongly recommend that an experienced veterinarian be approached to assist in setting up the feedback procedures for two reasons. First, the feedback process is so critical to successfully managing TGE and minimizing the chances of it going chronic. Second, herds differ greatly in how they might best approach the issue, due to many factors including differences in barn layout.

At the Centre, all animals in the breeding herd and in the replacement gilt pool received feedback 4 times, at 3 to 4 day intervals each. This ensured that all pigs in the breeding herd were well exposed to the virus; all animals received the feedback 4 times, irrespective of whether or not they had showed clinical symptoms after an earlier feedback.

6.2. Impact on Staff and Family Members

One of the most significant effects of the disease is not on the pigs, but on the people working with them. It is a very depressing experience for people otherwise working very hard at maximizing animal well-being and achieving a high level of herd productivity to witness the illness and mortality associated with an acute outbreak of TGE.

Two suggestions are offered. First, it is very important to provide as much information as possible, as soon as possible, on what to expect. This is one of the reasons the Prairie Swine Centre decided to prepare this report on its experience with TGE. The more informed people are, the easier it is to deal with the frustrations and depression associated with an outbreak.

The level of expected mortality is well documented and the duration of the disease is also predictable. Having this information early in the outbreak helps to assure staff or family members that they are not alone and that an endpoint is not too far away.

6.3. Review of Biosecurity

The outbreak of TGE at the Prairie Swine Centre revealed that our biosecurity procedures were not adequate. We thought our procedures were quite tight prior to the break, but clearly, they were not tight enough, at least in one aspect. Consequently, a thorough review was undertaken, with a view to identifying areas of greatest risk and practical ways to eliminate, or at least minimize, this risk. The focus on change was on three areas: visitor and staff movement, entry of materials and supplies into the barn and transportation of pigs to market.

The general process involved in a biosecurity review has been outlined in detail in the Summer, 1995 issue of *Centred on Swine*, available on request from the Centre.

6.4. Financial Response

The loss of 426 piglets was a serious concern to the Centre for obvious reasons. Fortunately, the Centre has extra farrowing crates and these could be used to farrow out extra gilts bred specifically to recoup this loss. Piglet mortality resulted in reduced market hogs, providing a space to house bred gilts waiting to farrow. Not all herds can handle the situation in this manner; however, it illustrates that at least in some cases, imaginative ways are available to minimize the economic impact of TGE.

A total of 55 gilts were bred; they averaged 11.4 total born, 10.7 born alive and 10.0 weaned per litter for a total of 551 additional pigs. Adjusting for mortality, about 520 additional pigs were available for sale.

7. ECONOMIC IMPACT

Total mortality attributed to TGE was 426 animals, equivalent to 1.52 pigs/inventoried sow; all of this mortality occurred in pigs less than 3 weeks of age. This is on the low side of the normal range for TGE of 1.3 to 2.0 pigs/sow in inventory. The following budget outlines the cost of the TGE in terms of lost production as well as the value of the extra animals achieved by extra matings over a 12 week period.

Total piglet mortality was 426. The gross margin (market price less feed cost less \$12 for other variable costs) lost as a result of this mortality was estimated at \$39,192, based on market prices and feed costs in place at the time these pigs would have gone to market.

The only cost associated with reduced growth rate was the value of the inventory retained as live animals rather than being converted into cash. With the inventory of market hogs valued at \$173,000, at 10% interest over 10 days delayed growth, the total cost would be \$475. No other costs were assigned to slow growth; the unfortunate consequence of mortality due to TGE is a freeing up of space in nurseries and growout, so delayed growth has little other economic cost.

Because pigs were fed for an additional 10 days, there was a substantial increase in the feed cost per pig sold. This was estimated at \$5,460 in growout and \$290 in the nursery, for a total of \$5,750.

Because the sows bred during or immediately after the TGE outbreak experienced a reduction in subsequent reproductive performance, this also had to be included in the budget. For example, delayed rebreeding had the effect of reducing herd output by 6 litters, equivalent to 61 pigs or \$5,575. In

Table 4. Economic analysis of TGE impact on herd productivity

Item	Amount
Piglet mortality	\$ 39,192
Reduced growth rate	475
Feed	5,750
Reduce subsequent reproductive output	10,047
Direct labour	6,000
Cost of breeding extra gilts	7,955
TOTAL COST	\$69,419
Income from extra gilts retained	32,240
TOTAL RECOVERY	\$32,240
NET COST¹	\$37,179

¹Thus, the net cost of TGE to the Prairie Swine Centre, in terms of herd production, was more than \$37,000. This does not include the impact of TGE on the research program.

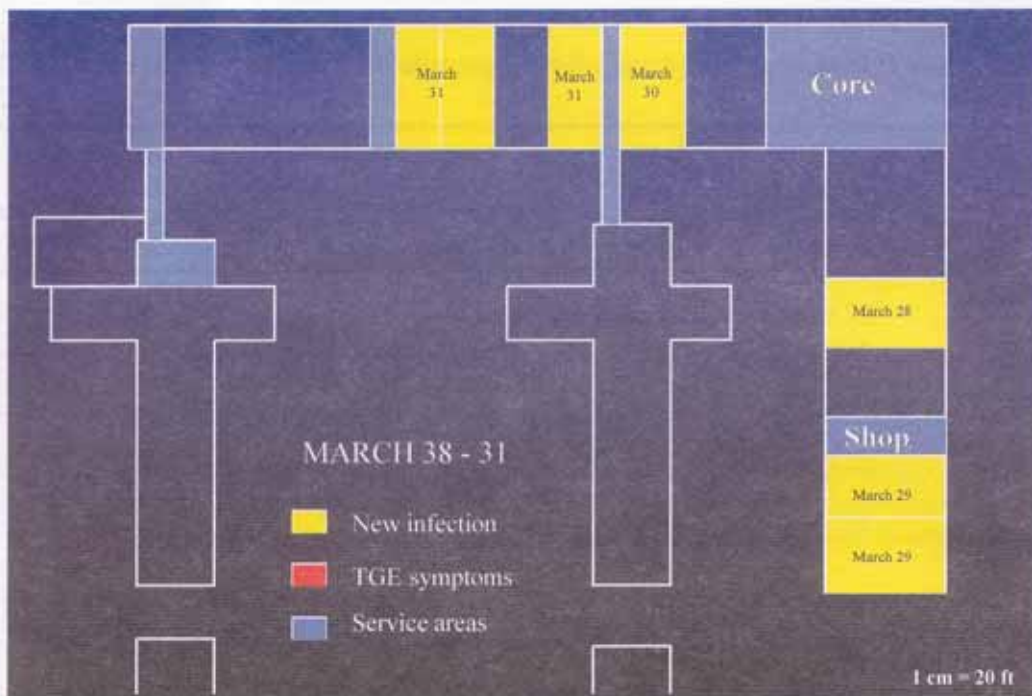
addition, 16 sows were culled specifically due to TGE; replacement of these animals was estimated to cost \$80 each, for a total of \$1,280. Finally, reduced litter size over a 5 week period resulted in 42 fewer piglets weaned, valued at \$3,192.

The total of all of these losses was \$55,464. This does not include additional labour costs associated with barn cleanup (207 hours) or the many extra hours worked by regular staff to treat piglets, handle the feedback procedures and complete the many other extra jobs that needed to be done. A very conservative estimate of \$6,000 will be used in this budget.

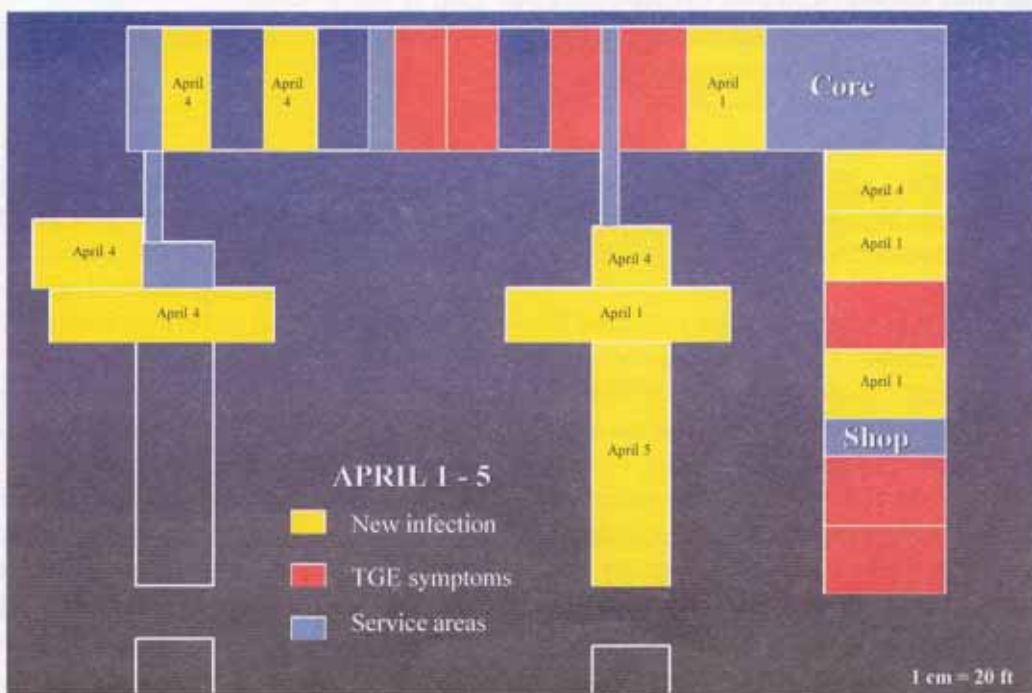
In order to offset the losses associated with the TGE outbreak, 55 gilts were bred, producing 551 additional piglets. After accounting for mortality, which was above average due to crowding in the barn (!), 520 additional animals were sold. At the time of preparing this report, all of these animals had not yet been sold. However, a market price average of \$155 was used; feed costs were the same as used in earlier calculations, as they had been locked in earlier. Thus, gross margin on these additional pigs was estimated at \$62 or \$32,240. Offsetting this additional income was the cost of retaining the extra gilts, including feed and the time cost of money; this was estimated at \$7,955.

8. CONCLUSIONS

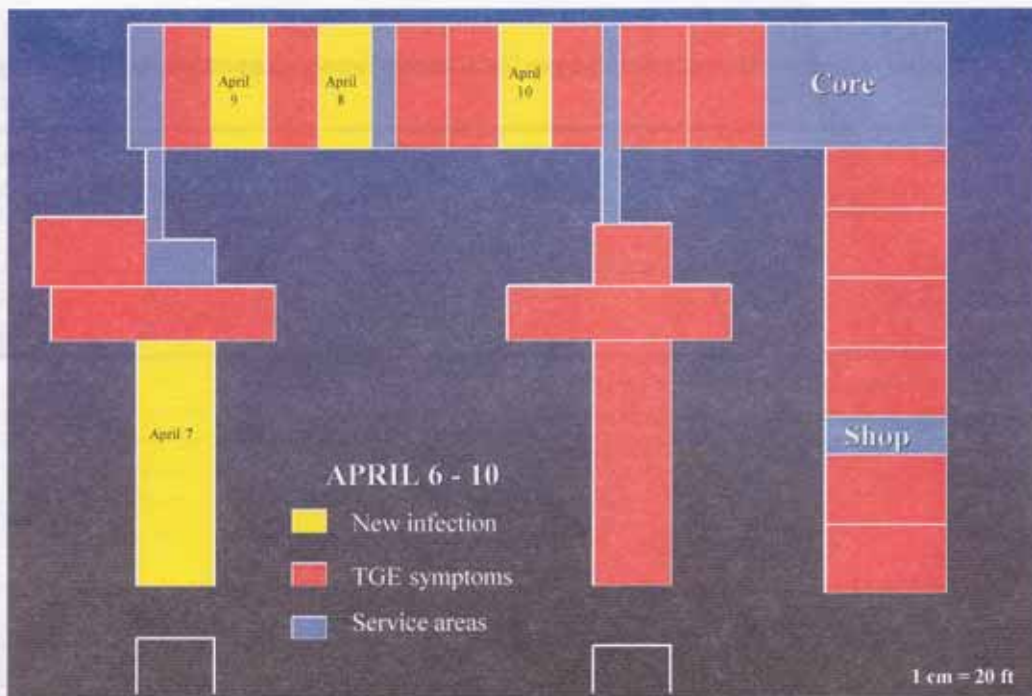
1. TGE is a highly contagious disease; it entered PSC via the growout barn and rapidly spread throughout the total unit. It was not possible to determine the exact mode of entry.
2. Because the virus responsible for TGE is resistant to freezing, but susceptible to sunlight and drying, outbreaks on the Prairies are most common in warm spells during the winter or spring.
3. Mortality was restricted to nursing piglets and totalled 1.5 pigs/sow inventory. However, performance was reduced in growout, nursery, farrowing and breeding areas.
4. Methods exist to eliminate TGE from the barns; they are not foolproof and only time will tell if we are successful. At the time of printing this report, no clinical symptoms of the disease have reappeared at the Centre.
5. The public reaction to the TGE outbreaks reflects the high regard our industry has for herd health. We encourage everyone to review their biosecurity procedures in order to maintain the highest possible health status on their farm.
6. The gross cost of the outbreak was \$69,000. Additional gilt matings recovered a portion of this loss so the net cost to the Centre was approximately \$37,000.



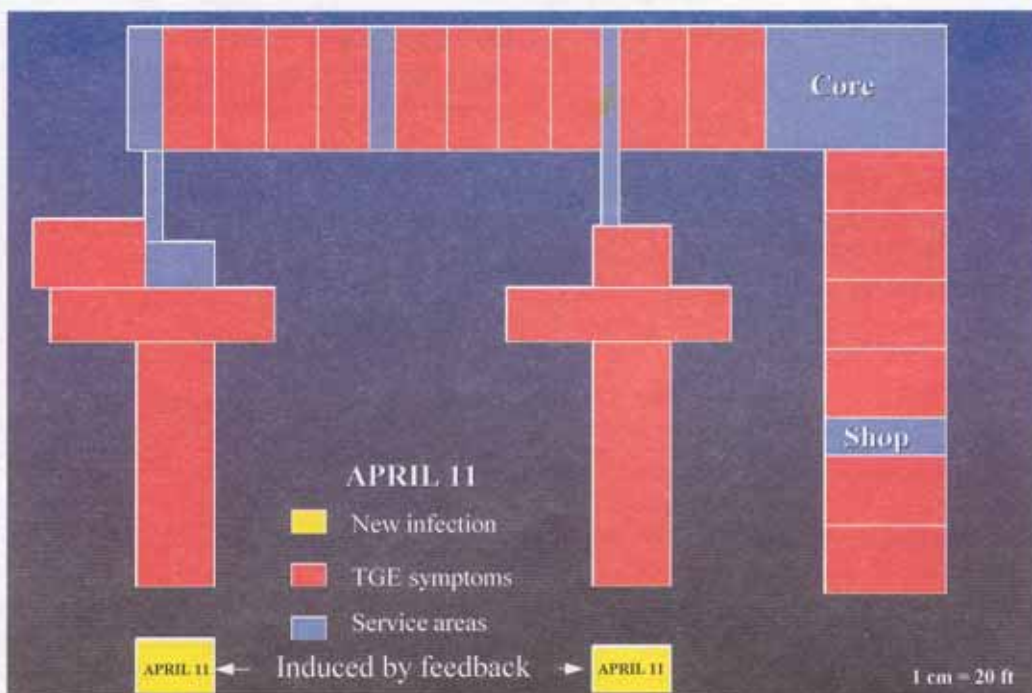
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Slide 2



Slide 3



Slide 4



Prairie Swine Centre Inc., a non-profit research corporation, is located south of Saskatoon. The Centre encompasses a 280 sow farrow to finish operation which focuses on research, education and technology transfer, all directed at the enhancement of efficient, sustainable, pork production. The Centre is a unique Canadian facility for the study of management systems aimed at improving growing-finishing pig performance, utilization of opportunity feeds for swine, improving air quality in swine buildings and the integrated study of swine behaviour in modern management systems.

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