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What would Dr. Leman do ... for PRRS?

Julie Ménard  
F. Ménard Inc.

First of all, I would like to thank Dr. Morrison and the committee of the University of Minnesota for choosing me for this great honor. The Al Leman Science to Practice award is a gift in my life and in my career. I am very proud to be part of the impressive list of past award recipients.

I didn’t have the chance to be a grad student with Dr. Leman but from what I have heard about him, these were some of his great qualities: passion, charisma, a people person, proactive and cost sensitive. He was a leader for the entire vet community. An inspiration for not only good science, but also good swine practice. People told me that he was a very good practitioner, one who was very observant on farms. Dr. Leman was also admired for his work at the University of Minnesota in the ‘80s. He has been the academic advisor of many very good grad students: Drs. Sylvie D’Allaire, Bob Morrison, Monte McCaw, Tim Blackwell, Tom Stein, Morgan Morrow, Kirk Clark and JP Vaillancourt. These students are his legacy and the excellence of their work is a testimony to the quality of their advisor.

Thanks Dr. Leman!

One of the first times I saw him was at the Swine Herd Health Programming Conference in 1988. He gave a presentation called “the Diagnosis and Treatment of Food Animal Educational Diseases”. A piece from his paper was the following:

- Livestock producers want and will continue to want veterinary service. They want veterinarians to:
  - Be co-responsible for farm success or failure.
  - Help share the burden or worry.
  - Compare their farm with other similar farms.
  - Authenticate their farm decisions and judgments.
  - Increase farm profits by reducing costs and increasing through-put.

This is still our role as veterinarians in 2012. During the same Minnesota conference he also gave a presentation on “Repopulation Strategy and Cost”, almost as if he knew that PRRSV would become the most economically significant swine pathogen around the world. Sadly, he disappeared before science taught us so much about PRRSV epidemiology and control. And we are still learning. This is the core of the presentation today- to imagine what Dr. Leman would do… for PRRS.

My history with PRRS

I graduated in 1987 from the University of Montreal in Canada. I started work right away with an integrated swine company in Quebec, F. Menard. This company puts 1 million pigs on the market each year and is located in an agricultural and hog dense area. My first PRRS case was in 1988 and since then, I have faced more than 500 cases. My ultimate dream, after these 24 years of battle against that disease, is to have complete control of it!

Dr. Leman was very sensitive to cost and he would have been really amazed by the cost of PRRS in United States, estimated at $664 million per year. In Canada we estimate the annual cost is 150 million dollars per year and within the F. Menard system, each PRRS outbreak represents a loss of $350 per sow (including costs for maternity, nursery and finishers).

The F. Menard headquarters is in the middle of one of the densest hog regions in Quebec – La Montérégie. Pig production in that region is a mix of contracted farms from different integrators and farrow to finish farms from independent producers. Many pig farms were constructed in this region in the ‘80s and ‘90s because of the good land for corn and the ease in spreading manure. The proximity of the farms is convenient for feed delivery, pig transport and slaughtering facilities but also for PRSSV transmission. A study from CDPQ (Centre de Développement du Porc du Québec) showed that 41% of the sow operations in Quebec have at least 2 sites (either nursery and/or finishers) within a distance of 1 km.

My Ange-Gardien sow facility, a 2750 sow barn, has more than 20,000 pigs as well as a slaughtering plant within a 3 km radius. This farm experienced more than 12 new PRRSV introductions between 2004 and May 2012. There is a dramatic impact on the number of pigs weaned per sow per year and nursery mortality with every new outbreak.

I made a compilation of incidences of new PRRSV strain introduction in the F. Menard sow herds between 2004
and 2012. I defined a new PRRSV strain introduction as when the homology based on ORF5 sequencing was more than 2% different from previous strains. I classified farms according to their location: remote area (more than 3 km away from other farms), medium to dense area (1 to 3 km) and dense area (more than 2 farms < 1 km). The results were that the average number of new PRRSV strain introductions per month: remote area (had 1 every 204 months), medium to dense area (1/27 months) and dense area (1/11.3 months) (Table 1).

I also compiled the number of new PRRSV strain introductions by month from January 2004 to May 2012 in the F. Menard sow herds (Figure 1). It is very interesting to observe that there is a peak of virus introduction in November similar to what Dr. Morrison observed in a recent compilation. Incidences of PRRS increase in winter months.\textsuperscript{20} PRRS has been the agent to fight and try to control over the past 24 years and I would like to share with you some of the interventions that have been adopted. I wonder if Dr. Leman would have done the same…

### Controlling the system to minimize disease expression

High prevalence of PRRS within the F. Menard system gave us the opportunity to better structure our system.

<table>
<thead>
<tr>
<th>Farms Type</th>
<th># Farms</th>
<th>Total #sows</th>
<th>Average number new strain introduction/month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote area isolated farms (&gt; 3 km)</td>
<td>4</td>
<td>5230</td>
<td>1/204</td>
</tr>
<tr>
<td>Filtered farms</td>
<td>2</td>
<td>1750</td>
<td>1/23</td>
</tr>
<tr>
<td>Medium to dense area (1 to 3 km)</td>
<td>11</td>
<td>14550</td>
<td>1/27</td>
</tr>
<tr>
<td>Dense area (2 farms or more &lt; 1 km)</td>
<td>3</td>
<td>4930</td>
<td>1/11</td>
</tr>
</tbody>
</table>

**Figure 1**: New PRRSV strain introduction into sow herds by month, January 2004 to May 2012. F. Menard sow herds 25000 sows.
What would Dr. Leman do … for PRRS?

For more than 10 years, we have organized our system to minimize diseases.

Indeed, the boar stud and the gilt multiplication herds are PRRSV naïve. They supplied PRRS negative semen and replacement gilts to our 20 sow herds. PRRS naïve gilts are specifically acclimated with the homologous PRRSV strain of each individual sow herd. Each sow herd supplies a set of nurseries and finishers. All flows are single source, multi-site, all-in-all out. Management practices are standard. This system allowed us to better control PRRSV as well as many other pathogens such as Salmonella, Mycoplasma, *Haemophilus parasuis* and so on (Figure 2).

Sow herd management to reduce impact of disease

The revolutionary work initiated in the mid 90’s by Dr. Monte McCaw completely changed how we manage suckling piglets. The underlying philosophy of McREBEL™ is that optimization of suckling piglet growth demands minimizing interventions and maximizing supportive care. Further works showed that McREBEL™ both facilitates and optimizes the growth of piglets as evidenced by increased weaning weights, decreased pre-weaning and nursery mortality, and increased average nursery close-out weights. This technique was even more advantageous and had a tremendously positive impact on reducing health problem in PRRS challenged sow herds.¹⁵,¹⁶

Dr. Leman would have certainly called his grad student a genius. Thanks Monte for that insight!

Since the early 2000’s, I have widely used the McREBEL technique in all my sow herds especially in PRRSV challenged situations. Over the years, I refined sow herd management in order to get the best immuned piglets with the lowest PRRSV load.

The Menard rules in sow herds are:

1. Do not induce sows. Let them farrow naturally.
2. Maximize colostrum intake from each individual piglet by suckling their own mother for the first 24 hrs after birth.
3. Leave the maximum amount of piglets with their mother at 11 to 14 piglets. The extra piglets in a litter of 15 piglets or more can be placed with litters of 10 and less. This should represent less than 10% of cross fostering.

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Figure 2:

**Boar studs + gilts multipliers (PRRS naive)**

- 20 flows of pigs
- Single source/3 sites/AI AO
- Individual gilts acclimatization
- In house gilts multiplication and AI
- Standard management practices
4. In a PRRS outbreak, completely stop the piglet cross-fostering. I call it: the integral McREBEL.

Following these rules really helped to reduce intensity and duration of disease challenges. It also contributed to increased weaning weights and decreased number of days to market.

Thanks Monte for your amazing contribution to the swine industry.

Would Dr. Leman have used gilt acclimatization in order to control PRRS in his herds?

Certainly!

The first real strategies on gilt development and introduction in breeding herds were described by Dr. Scott Dee. Some years later Dr. Montse Torremorell introduced additional information on how to introduce PRRS naive replacement gilts into a PRRSV positive herd. She claimed that PRRSV negative gilts are a must and I still think that these are the basics of successful gilt introduction.

Dr. Mark Fitzsimmons, Dr. Leman’s business partner at Swine Graphic, gave a very good presentation at AASV in 1999 on “PRRS control in large systems: Strategies for the future”. His paper was about his experience with gilt acclimation. He mentioned 2 simple facts:

1. Field virus results in effective long term protection.
2. If PRRS acclimatization is successful, the amount of virus in the sow farm is going to decrease drastically.

He presented a second presentation to Leman conference in 2002 where he went into more detail on his refined technique of acclimatization.

Dr. Scott Dee then introduced me to Dr. Laura Batista and her really elaborate and detailed strategy on gilt acclimatization through the use of seroimmunization. She has been a pioneer in gilt acclimation in Mexico as a practitioner. Dr. Laura Batista published a very good paper on eradication of PRRSV by serum inoculation with the homologous PRRSV strain. Key factors for best results were found to be:

1. Achieving complete herd sterilization for immunity to eliminate naïve subpopulations.
2. Exposure of replacement gilts for the next 5 months to the homologous PRRSV strain.
3. Farm closure.

Mark and Laura really became mentors to me. Their practical work shaped my F. Menard acclimatization program. F. Menard herds being in a hog dense area, new PRRSV strain introduction was a frequent event in our breeding herds.

Since gilt acclimation is the most important factor in sow herd immune stability, we developed a specific program for each sow herd in the late ’90s. The principle was to expose PRRS naïve gilts at an early age to the homologous PRRSV strain of the sow herds. Each sow herd was related to an offsite gilt acclimation barn. Future replacement gilts were sero immunized at 50 days of age and kept in the isolated barn for 135 days. They were then transported to a quarantine barn on the sow site where they were kept in a separated section for an extra 60 days. Finally gilts completed their extra long cool down in a gilt gestation section for an extra 4 months (Figure 3 and 4).

This controlled gilt acclimation protocol, including the very long cool down, has been a very good strategy for providing specific immunity in a hog dense area.

This technique allowed us also to proceed with PRRSV eradication without a production break. I call it “the Modified Herd Closure technique”. Respecting each rule is essential and when gilts are exposed with a short cool down, I suspect it can have some impact on PRRSV strain mutation. In these cases, gilt acclimation can contribute to production of PRRSV positive piglets at weaning and have an impact on sow herd clinical signs.

Our gilt acclimation program has been refined over time with the help of PRRSV sequencing. Tuning gilt acclimation according to the prevalent strain in the sow herd is also one of the most important factors. In the case of a new PRRSV strain introduction, the acclimation for the previous strain must be stopped and then started again with PRRS naïve gilts exposed to the new PRRSV strain.

Knowing the sequence you deal with is essential for a perfect result.

What would Dr. Leman have thought about using PRRSV sequencing to help in PRRS control?

I am pretty convinced that he would have widely used this diagnostic tool to better understand transmission of PRRSV between herds. He would have also followed all the good work done by his grad student, Dr. Sylvie D’Allaire, very closely.

Before 1998, I saw many PRRS outbreaks in sow herds but I could not determine the source of contamination. The diagnostic tools were not available.

In 1998, an epidemiological project on PRRSV in Quebec was initiated. Dr. Sylvie D’Allaire from the University of Montreal and Dr. Larochelle and Dr. Magar from CFIA, came together to sequence PRRSV strains from field cases based on the ORF5 gene. Six practitioners, including myself, and 2 veterinarians from Boehringer Ingelheim...
What would Dr. Leman do ... for PRRS?

**Figure 3:** Specific gilt acclimatization.

EXPOSURE

- Séro immunization

<table>
<thead>
<tr>
<th>Sow herd</th>
<th>Gilt acclimatization barn A</th>
<th>Gilt barn B</th>
<th>Gilt barn C</th>
<th>Gilt barn D</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Isolated offsite

**Figure 4:** Long term gilt acclimatization and parity one segregation.

Sow herd and gilt acclimatization become one single unit

45 days old

50 days old

345 days old

Sero immunization

AI/IO section - 55 d

Continuous section - 80 d

Cool down

P2 + herd

P1 farrowing rooms

Gilt gestation

AI/IO section - 50 d

AI/IO section - 50 d

PRRSV naive gilts

PRRSV immunized gilts

50 days old

345 days old

2012 Allen D. Leman Swine Conference
and Schering-Plough collaborated on this project. PRRSV sequences were identified in 226 field cases over a 4 year period (1998-2002) and some relationships between strains were identified (Table 2). This new diagnostic tool brought useful information on PRRS transmission to the forefront.

We then started to establish links for the different routes of contamination within our organization: introduction of PRRSV positive gilts, contaminated semen, transport of commingled piglets, contaminated environment, fomites, rendering trucks and aerosol dispersion. In some cases we could point out the presumptive reasons and make corrections.

Presently in 2012, the Faculty of Veterinary Medicine (FVM) of the University of Montreal stores more than 2,500 PRRSV sequences from Quebec field studies and Dr. D’Allaire has been able to make groupings of PRRS viruses using these sequences. A predominant strain called “Tsunami” or “Raz de marée” represents 10% of the entire FVM sequence database. This strain appeared in 2007 in Quebec’s swine herds and its prevalence has since increased. The homology between sequences varies from 93.6% to 100%. This “Tsunami” strain represents 13% of the F. Ménard sequences and seems to spread easily within our system through indirect transmission. We had to revise our rules on biosecurity due to this contagious strain.

The use of ORF5 PRRSV sequencing has also become a crucial tool over time to differentiate contamination by aerosol transmission or through breaches of biosecurity. The best example is when a filtered farm gets infected. It is a priority to find the source of contamination in order to prevent the introduction of other PRRSV infections. We cannot assume that filters do not work when the contamination is in fact related to poor biosecurity.

Use of sequencing is also helpful to trace back the origin of a contamination from a biosecurity breach such as the introduction of contaminated material or a transport vehicle. It is a more powerful tool than RFLP patterns to help identify the source of a new PRRSV introduction and all swine veterinarians should use this important diagnostic tool in their everyday practice. A more extensive use of ORF5 PRRSV sequencing would certainly help reduce the number of new PRRS outbreaks and improve overall PRRS control.

What about pen-based oral fluid testing for PRRSV surveillance?
This technique is a revolution! This new method is already used by many practitioners around the world and will be more and more in the coming years. It is simple, reliable and a very accurate diagnostic tool. It facilitate rapid data collection and is safer for both pigs and staff. We have been using more extensively oral fluid testing instead of serum collection for PRRSV detection in gilts flow.

<table>
<thead>
<tr>
<th>Relationship</th>
<th>Number of strains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction of piglets</td>
<td>24</td>
</tr>
<tr>
<td>Introduction of replacement gilts</td>
<td>11</td>
</tr>
<tr>
<td>Same herd of origin</td>
<td>25</td>
</tr>
<tr>
<td>Same site of production</td>
<td>7</td>
</tr>
<tr>
<td>Fomites</td>
<td>6</td>
</tr>
<tr>
<td>Area spread</td>
<td></td>
</tr>
<tr>
<td>Distance between farms &lt; 3 km: different ownership</td>
<td>15</td>
</tr>
<tr>
<td>Distance between farms &lt; 3 km: same ownership</td>
<td>9</td>
</tr>
<tr>
<td>Distance between farms &gt; 3 and &lt; 10 km: different ownership</td>
<td>14</td>
</tr>
<tr>
<td>Distance between farms &gt; 3 and &lt; 10 km: same ownership</td>
<td>8</td>
</tr>
<tr>
<td>Distance &gt; 10 and &lt; 30 km</td>
<td>14</td>
</tr>
<tr>
<td>Same organization</td>
<td>29</td>
</tr>
<tr>
<td>Vaccine-like</td>
<td>25</td>
</tr>
<tr>
<td>Unknown</td>
<td>16</td>
</tr>
</tbody>
</table>

* Numbers do not add up to 183 because some strains were involved in more than one relationship.
What would Dr. Leman do … for PRRS?

What about Dr. Leman’s perception of biosecurity today?

He would have recently been impressed by all the good work done at the University of Minnesota on PRRSV transmission\textsuperscript{14,21} routes. As a practitioner, I followed all these studies very closely and it is clear that PRRSV can be transmitted through pigs, semen, coveralls, boots, needles, fomites, insects, transport, aerosol and more recently manure. All these discoveries have been very helpful in better educating producers.

An epidemiological study carried out in Quebec between 1998 and 2003, by Drs. Larochelle, D’Allaire and Magar also showed the importance of introducing infected animals and area spread in the contamination of herds\textsuperscript{12}. A more recent epidemiological investigation by D’Allaire’s group showed that the 4 main factors associated with PRRSV positive status were large pig inventories (OR:10.7), proximity to a closed pig site (OR:7.3), absence of showers (OR:8.7) and free access to the site by the rendering truck (OR:7.0). This study was performed on 54 breeding sites in Quebec, Canada from 2006 to 2008\textsuperscript{11} (Table 3). The same group of researchers suggested, in another paper, that transmission of PRRSV is more likely to occur between sites belonging to the same owner and through areas within a 5 km distance\textsuperscript{10} (Table 4).

All this said, it is a fact that the risk of getting infected through aerosol transmission in a hog-dense area is very high. However, it is often too easy to assume that contamination comes from the neighbor when in fact it is related to a breach in biosecurity.

Within the F. Menard database of PRRSV strains, we have many different groupings of sequences showing internal transmission. I have over the last 14 years a great amount of evidence of contamination by personnel, fomites, transport and the environment. I will illustrate some PRRS contamination cases in my presentation. Some of

| Table 3: Predictors associated with PRRS positive status using multivariable logistic regression model with robust SE on ownership (54 sites). |
|---|---|---|
| Description of predictors | Odds ratio | P-value |
| Heat producing unit > 300 (HPU)\textsuperscript{a} | 10.7 | 0.02 |
| Distance from closest pig site ≤ 2.5 (km) | 7.3 | < 0.01 |
| No shower at the entrance | 8.7 | < 0.01 |
| Access to the site by rendering truck | 7.0 | 0.03 |

\textsuperscript{a} 1 HPU=1000 W at 20°C; calculated using the following equation, HPU = 0.17 × (weaners and finishers) + 0.30 × (gilts and sows) (Flori et al., 1995).

| Table 4: % of pair wise combinations having ≥ 98% homology between wild type strains over total number of combinations – 122 sequences – 7381 pair wise combinations. |
|---|---|---|
| Distance between sites | Same ownership | Different ownership | Total |
| ≤ 5 km | 16.0% | 0.9% | 1.8% | 16 × 100 |
| 8/50 | 6/785 | 13/835 |
| > 5 km to ≤ 10 km | 9.6% | 0.3% | 0.8% | 32 × 100 |
| 8/83 | 5/1453 | 13/1536 |
| > 10 km | 5.2% | 0.4% | 0.6% | 13 × 100 |
| 9/174 | 20/4853 | 29/5010 |
| Total | 8.1% | 0.6% | 0.8% | 14 × 100 |
| 25/307 | 32/7074 | 57/7381 |

the most recent PRRS cases have allowed me to presume a high resistance of some PRRSV strains in the environment. A recent PRRSV strain has survived more than 70 hrs on material and would have infected one of my PRRS naïve sow herd.

These cases show that my regular biosecurity rules were by-passed (or not respected?). The use of log books to trace back events has helped me a lot. We use them for pig transports, rendering trucks, maintenance crews, personnel and visitors, and feed delivery. I have used log books for each PRRS outbreak occurring in any F. Menard herd and with the help of PRRSV sequencing, we have been able to find the source of contamination in many cases.

Strict compliance with biosecurity rules is the single most important factor. This is the foundation of PRRS control. But, as I said, in hog-dense areas, aerosol transmission can be a frequent event and in these cases, barn filtration and regional control projects are good options.

**Would Dr. Leman have used air filtration to prevent new introductions of PRRSV?**

Dr. Leman was very sensitive to cost and according to Dr. Carmen Alonso, filtered sow farms had improved productivity when compared with non-filtered farms and the payback period for the investment was estimated at 5.5 to 6.4 years. Based on these facts, I am very convinced that he would have adopted this new technique.

My first approach to filtering barns was actually following the research of Dr. Scott Dee. It was a very attractive option to solve aerosol transmission. Dr. Darwin Reicks was definitely the pioneer of air filtration in commercial barns. His presentation at the 2006 Leman conference called “Alternative filters for boars” really motivated me to put filters on a commercial sow barn.

So in 2008, the first F. Menard sow barn was installed with filters. It was a barn situated in a medium to dense area which was experiencing PRRS outbreaks every 1½ years. We were very excited about this new project. We thought it would solve all our PRRSV problems. What a surprise! One year after installation, the farm had an outbreak with a new PRRSV strain. I had to find the reason for this outbreak. With the help of the PRRSV sequencing, I was able to find that the strain was 99.5% homologous to a strain identified on a F. Menard sow barn located 9 km away at the Ange-Gardien farm. The contamination was definitely coming from within our system. After an investigation and analysis of the log book, I identified 2 main hypotheses for the contamination: The first one was that manure from the Ange-Gardien farm had been spread close to the filtered farm and we still did not have backdraft dampers installed on certain fans. The second hypothesis was through the introduction of gilts. The truck went with the gilts on a scale in Ange-Gardien, where all the trucks from F. Menard go with pigs to be weighed. The gilt truck then took a road that was frequented by Ange-Gardien piglets to go to the filtered farm. The second hypothesis was the most likely to be correct. The other important detail is that the first case of fever on the farm was in gilts. I then learned that public scales and roads in hog-dense areas are very dangerous places to travel through with replacement gilts. Following that outbreak, we stopped weighing gilts at the public scale, we took alternative roads for gilt transport (low density areas), we introduced gilts only once every 2 months, we installed windsocks on all the fans to prevent air leakage through backdraft and we reinforced the monitoring by farm personnel. I could relate to Dr. Reicks in his AASV presentation in 2011: “Life in the bubble: what is it like to have a filtered sow farm?”

Filtration for this farm has been very effective in preventing the introduction of new PRRSV strains. From an analysis looking at 44 months before and after filtration, we observed that we had 4 new PRRSV introductions pre-filtration versus 1 post-filtration. The farm returned to its negative PRRS status and the number of pigs sold per sow per year is continuously increasing. Twelve farms in Canada have been equipped with antimicrobial filters since 2008. It seems to have decreased the rate of new PRRSV introductions but there is very little data. Some farms broke with PRRS post filtration and most of the new introductions seem to have been related to breaches of biosecurity.

A new paper has just been released by Dr. Dee’s group on evaluation of the long term effects of air filtration on the occurrence of new PRRSV infections in large breeding herds. Thirty eight herds participated in the analysis from September 2008 to January 2012. Results showed that the odds of a new PRRSV infection in breeding herds before filtration were 7.97 times higher than the odds after filtration was initiated.

Dr. Alonso and his co-authors also recently did a very good epidemiological study on air filtration for preventing PRRSV infection in large sow herds. The study indicated that air filtration led to an approximately 80% reduction in the risk of introducing new PRRSV strains.

Air filtration is very effective in reducing contamination by aerosol transmission. It is a very valuable tool to protect sow herds in hog-dense areas and is a very important element in all PRRS regional control projects.
What would Dr. Leman do ... for PRRS?

Would Dr. Leman have been involved in one of these PRRS regional control projects?

I think so.

Dr. Leman was a visionary and very pro-active and he would have certainly supported the projects of his excellent grad student, Dr. Bob Morrison. Swine Graphic being in the dense area of Iowa, he would have certainly considered starting one of these projects.

The first PRRS regional control project was initiated by Dr. Morrison in the Rice County of Minnesota in 2002. Since then, many other projects have emerged. In 2012, we can count more than 20 regional projects across the United States which aim to control or eliminate the PRRS virus. Since 2006, other projects have started in other countries such as Chile, Mexico and Canada. The Niagara region of Ontario has been a Canadian pioneer in initiating a project under the governance of OSHAB. Ontario currently has more than 150 sites in different regions. Alberta is also participating with 26 sites and Quebec with 236 sites, 10% of all the sites in the province.

These Quebec projects are supported by the Federation of Pork Producers, the CDPQ (Centre de Développement du Porc du Qc) and the Quebec Ministry of Agriculture. These controlled projects started in September 2011. The projects are currently in their infancy but there is an urgent need since 90% of the sites in the project are PRRS positive. The number of sites, sows and density are very different among the different regions.

In some regions, 50% of the sites are farrow-to-finish farms and independent producers while in other regions it is mostly integrated companies and 3 production sites. In our region, the Monteregie, 4 integrated companies control 76% of the sites and all of them are multisite production. The other 24% are independent producers, mostly farrow-to-finish farms, and are very pro-active. The board of directors brought together independent and integrated producers, technical services and veterinarians from the major companies. This set up is ideal for decision-making and a homogenous action plan. The biggest challenge was to get a common agreement among vets but once the decision was made, on-farm implementation was very quick.

The goal of these regional projects is the same as with all the other projects: to decrease the incidences of new PRRSV contamination, decrease the number strains within a region and to understand PRRSV transmission within and amongst regions. The benefits of these projects are that we know the location of each pig site, their function (Farrow to finish, maternity, nursery or finisher) and PRRSV status by sequencing identification. We now have more reliable information about PRRSV status related to adequate diagnostics and with the collaboration of producers, we know when there is a new event such as a PRRS outbreak. It increases the knowledge of producers as well as communication between them. Consensus on which strategy to adopt within each region with regards to PRRS control is also a very positive result.

In our region, sequence analysis gave each integrator the opportunity to look back at their system and realize that aerosol transmission was not a frequent event but that most of the contaminations were the result of internal transmission.

The highlights of the Monteregie action plan are:

1. Create clusters of production
   - The integrator nurseries and finisher barns will be supplied with piglets coming from sow herds in the region.
   - The goal: prevent introduction of PRRS infected piglets in the regions (meaning a new PRRSV strain).

2. Stabilize sow herds
   - Herd closure and/or offsite gilt acclimatization to homologous PRRSV strains.
   - The goal: Get back to a PRRS negative state.
   - Farrow to finish farms: introduce PRRS naïve gilts as weaner and acclimatize them to the homologous PRRSV strain.
   - Use the same commercial PRRSV vaccine to protect all the sow herds in the region.

3. Reinforce internal biosecurity
   - Apply the McREBEL technique. Minimize cross-fostering of piglets.
   - One needle per sow for every injection including vaccines.
   - One needle per litter.
   - Respect of AI/AO per room. Ideally batch farrowing. Allow a complete AI/AO for farrowing rooms.
   - The goal: Minimize the infection pressure to the lowest rate possible.

4. Adoption of a unique PRRSV vaccine strain
   - Vaccinate sow herd after eradication
   - Flow of PRRSV negative pigs into the nursery and finishers
   - The goal: prevent a susceptible population within the region.
Keynotes

Julie Ménard

5. Strengthen external biosecurity
   • Revise rules regarding indirect transmission within integrated companies (transport, personnel, fomites)
   • The goal: decrease PRRS transmission between sites of the same owner.

We have great hope in this project but as Dr. Pinilla mentioned at AASV 2006 in his paper “PRRSV eradication in Chile: just one positive farm remaining in the country is enough to put all the work accomplished so far at risk”. The positive outcome is that Chile is now free of PRRSV!

Which research would have interested Dr. Leman the most?

Definitely the PRRS genetic resistance one.

The PRRS Host Genetics Consortium project funded by the National Pork Board has discovered a genetic marker in pigs that can identify whether or not a pig has a reduced susceptibility to PRRS. This breakthrough represents a real hope in controlling this costly disease.

This group of scientists at USDA’s ARS, Kansas State University and Iowa State University, have identified chromosomal segments common to pigs that had lower levels of PRRS virus circulating in their blood and that grew faster after PRRS infection.

These findings indicate that there are significant genetic differences between pigs in their response to PRRSV infection. Discovery of that marker might represent a magic tool that genetic companies will use in the future to select their most PRRS resistant animals and all pig producers should benefit from it.

F. Menard is very proud to say that they have been part of that project. Indeed they supplied piglets in collaboration with genetic companies on the viral load, weight gain research project.

What about research on vaccines?

Many papers have been published over the years on the positive impacts of using commercial modified live vaccines for PRRS control in breeding herds and growing pigs. The cross protection against a heterologous strain is, however, not 100% effective and the search for the ultimate vaccine is still a work-in-progress.

There is no research which has received more attention and funds than the one on the universal vaccine, but the vaccine won’t be available in the near future. PRRSV is a virus with an amazing ability to mutate and develop very complex immunity mechanisms. It is why great immunologists such as the group with Dr. Murtaugh at the University of Minnesota are still working hard to discover “the” mechanisms.

It is better to rely on available tools right now, and when the magic vaccine comes, it will be like a gift!

Where do we go now in terms of PRRS control?

We have learned a lot on PRRSV transmission, epidemiology, diagnostics, biosecurity, herd stabilization and eradication since Dr. Leman left the scene. We now, as practitioners, have to use all the research results available and apply these tools in our day to day work. Information is universally available. The everyday work at each and every pig farm is what will make the difference.

Be pro-active. Be part of your producers’ success!

What will we do when PRRS is completely eradicated?

We will have more time to enjoy life!

Thanks, Dr. Leman, for your inspiration.

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What would Dr. Leman do ... for PRRS?

References
