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Ontario Animal Health Network (OAHN)
Swine Network
Quarterly Veterinary Report

IN THIS ISSUE

Disease and Survey Discussion

PORCINE EPIDEMIC DIARRHEA (PEDV) / PORCINE DELTACORONAVIRUS (PDCoV)

Jessica Fox, Manager at Swine Health Ontario reported the following cases in Q4:

Dec 02, 2021 Huron	PDCoV	Nursery
Nov 29, 2021 Huron	PDCoV	Farrow-to-wean
Nov 26, 2021 Huron	PED	Finisher
Nov 12, 2021 Oxford	PED	Finisher
Nov 04, 2021 Middlesex	PED	Finisher
Oct 13, 2021 Huron	PED	Nursery

There was 1 case of PEDV in a finisher in Lambton county in January 2022. It appears that most of these cases may have been associated with biosecurity issues related to transport or deadstock. The PED and PDCoV Tracking map is available at the Swine Health Ontario website and shows current and annual cases by county. http://www.swinehealthontario.ca/Disease-Information/PED-PDCoV-Tracking-Map

INFLUENZA A (IAV)

One hundred % of practitioners continue to rank the frequency for IAV as common (50%) and very common (50%). Sixty-six % of practitioners indicated that IAV activity had increased in Q4 vs Q3. There were no further comments from practitioners about change in severity of clinical signs in Q4. AHL data indicated an increased number of submissions in Q4 vs Q3. The following genotypes were identified in 54 submissions in Q4 2021: Subtype H1N1 classical = 1 total with 0 alpha, 1 beta, 0 gamma. Pandemic H1N1= 5. subtype H3N2 = 11 total with cluster Ivb = 4, cluster Ivx1 = 2, cluster Ivx2 = 1, untypable = 4. Subtype H1N2 = 37 with 16 alpha and 21 beta. Gallant Laboratories Ontario data included the following genotypes identified in Q4 2021: Subtype H1N1 = 4, subtype H3N2 = 1, subtype H1N2 = 1.

PORCINE CIRCOVIRUS 3 (PCV3)

Dr. Josepha Delay provided some direction on criteria that diagnosticians can use in determining the significance of PCV3 findings. Dr. Delay reviewed a recent paper that discusses PCV3- Associated Disease: Case Definition and Diagnosis.

Disease and Survey Discussion Continued …

Diagnosis of PCV3-Associated Disease (PCV3-AD) is becoming more common in North American swine. The frequency of diagnosis in Ontario herds is low, but PCV3-AD is a consideration in cases of reproductive loss and poor nursery pig performance. Importantly, direct disease causation by PCV3 still remains to be proven, although evidence is growing that the virus is responsible for disease in swine. Similar to disease attributed to PCV2, it has been suggested that for diagnosis of PCV3-AD, cases must meet a specific 'case definition' that includes clinical, pathologic, and molecular testing criteria.

Clinical criteria:
- PCV3 reproductive disease: late abortions, mummies, stillbirths, weak neonates, possible congenital malformations
- PCV3 systemic disease: wasting / weight loss, ill thrift / poor doers, possible neurologic signs

Diagnostic criteria (for both syndromes):
- Microscopic (histologic) evidence of multisytemic lymphoplasmacytic to lymphohistiocytic perivascular inflammation
- Detection of PCV3 nucleic acid in lesional tissue in moderate to high amount (by PCR and / or in situ hybridization (ISH) for PCV3)

In summary, to reach a diagnosis of PCV3-AD, pigs must have appropriate clinical signs, specific pathologic lesions must be identified, and PCV3 must be identified in association with the lesions. Optimal tissues to submit to the diagnostic laboratory for investigation of PCV3-AD are as follows:

Reproductive disease: entire fetuses and placentas

Nursery pigs and other age groups: fresh and formalin-fixed heart, kidney, and spleen, as well as formalin-fixed samples from a wide range of other tissues. Providing a thorough clinical history and description of gross lesions to the laboratory is important in reaching a diagnosis of PCV3-AD.

Reference: Saporiti V, G Franzo, M Sibila, J Segalés. Porcine circovirus 3 (PCV-3) as a causal agent of disease in swine and a proposal of PCV-3 associated disease case definition. Transboundary and Emerging Diseases. 2021. 68: 2936-2948.

EAR NECROSIS / FLANK NECROSIS

There were three questions for practitioners included with the clinical impressions survey.

1. *How often have you seen ear or flank necrosis in your clients' herds over the last year?*
No one said that they had not seen any cases. 58% of respondents indicated they had seen cases in 1 to 3 out of 10 herds, 33% indicating cases in 4 to 7 out of 10 herds and 8 % in greater than 7 out of 10 herds.
2. *Over the past year, how often has ear or flank necrosis been a welfare or production problem on affected farms?*

Disease and Survey Discussion Continued …

All respondents indicated that they see at least some level of concern with respect to welfare or production. 67 % of respondents said that it was a welfare or production concern 1 in 10 affected herds, 25% indicated that it was a problem in 2 to 4 herds out of 10 affected herds and 8 % indicated a welfare of production problem in more than 4 herds out or 10 affected herds.

3. *Have you had success in treating or preventing ear or flank necrosis in herds?*
25.00% said they had no success in preventing or treating and 25 % said it comes and goes with no identified risks.

50.00% indicated that they did have some success with prevention or treatment associated with the following:

- decreasing temperature, reducing humidity, reducing drafts, environment (3), reducing stocking density (3), nutrition (4), water quality, water quantity, management;
- treating with antibiotics, topical spray with mineral oil plus antibiotics, fogging drying agents;
- intervention should be early and most issues begin at the end of the nursery stage.

OAHN Swine Small Holder Project Update

Dr. Josepha Delay provided an update on the OAHN Swine Small Holder Project. The OAHN small herd post-mortem project was developed to identify disease problems in this subset of Ontario herds, and to establish communication networks between small scale producers, veterinarians, and OAHN. A concurrent goal is to increase awareness of zoonotic and foreign animal diseases (FADs) among producers.

Participating herds are located in Ontario and have 50 or fewer sows, or market 1000 or fewer hogs annually. The herd must have a premises identification number (PID), and the producer completes a simple management survey. The herd veterinarian enrolls the herd in the project, and all test results are communicated through the vet. Postmortems are done either on-farm by the herd veterinarian, or at the Animal Health Laboratory in Guelph or Kemptville.

The project began in May 2020 and will end on March 31, 2022. As of January 2022, 23 cases have been submitted to the project, representing 17 herds and 10 vet clinics. Cases originated from many areas of the province, including eastern, southwestern, and northern Ontario. The average herd size was 39 pigs, with a range of 2-230 animals. Among the submissions, 14 (61%) cases represented specialty or pet breed herds (including 11 cases from Kunekune herds), 8 (35%) cases were from herds with commercial-type hogs, and 1 case was from a wild boar herd. A range of disease conditions common to larger commercial herds have been identified in the smaller herds, including septicemia, pneumonia due to Mycoplasma hyopneumoniae and Streptococcus suis, and rotavirus enteritis. Less common disease conditions seen in the small herds have included gastrointestinal parasitism due to whipworms, water deprivation, and mulberry heart disease and hepatosis dietetica as a result of selenium deficiency. Influenza virus has not been detected in any of the pigs from these small herds, and PRRSV was detected in 1 of 23 cases.

Laboratory Diagnostic Reports

Animal Health Laboratory Summary

Dr. Tim Pasma summarized findings from the AHL Syndromic Surveillance Q4

INFLUENZA
This has been an active influenza season with respiratory signs and mortality
• Week 37 (Sep 12) – seemed to kick off the fall increase. 4 of 5 submissions were for monitoring
• Week 47 (Nov 20) – 7 of 8 submissions reported sudden death and mortality. This seemed to be the start of 4 weeks of increased influenza activity
There has been a change in the dominant subtype throughout year
• 1st half of 2021 H1N2 was the dominant subtype
• 2nd half of 2021 H3N2 was common in summer and early fall and then more H1N1 in Nov Dec
H1N2 remains dominant subtype with H1N1 increased and now equal with H3N2

PORCINE EPIDEMIC DIARRHEA
There has been an increased number of PEDV detections throughout Q4

PORCINE DELTACORONA VIRUS
There has been an increased number of PDCoV detections throughout Q4 but not as big an increase as PEDV

SYNDROMIC SURVEILLANCE
There was a spike in mortality reported in week 46 (Nov 13) with 4 separate laboratory submissions death and respiratory signs in finishers. There was an increase in respiratory disease reported throughout a 4 week period in December and this increase was concurrent with an increase of influenza activity. An increase in the inclusion of a history of increased mortality in lab submissions increased at the same time that Influenza activity was increasing.

Animal Health Laboratory Diagnostic Reports

PATHOLOGY CASES
A total of 103 pathology cases were submitted to the AHL for 2021 Q4, with typical distribution of field PM histopathology cases (81%) and PMs at the lab (19%). Swine pathology cases increased by 32% in 2021, compared with 2020 submissions. Clinical history and age group were provided for 89% and 97% of cases, respectively. The downward trend for PID inclusion continues, with only 68% of cases listing PID on the submission form (down from 75% of cases in 2021 Q3). For field PM cases, inclusion of gross PM findings in the clinical history would be very useful in helping pathologists and other diagnosticians to make useful diagnoses for veterinarians.

Notable pathogens or disease syndromes detected during 2021 Q4 are as follows:
- PRRSV-positive case numbers increased to levels similar to 2021 Q1 and Q2. For PRRSV, the trend was noted among both respiratory and abortion cases (with a pathology component).

Laboratory Diagnostic Reports Continued …

- Influenza-positive cases also increased in Q4 and were similar to those in 2020 Q1 and 2021 Q2.
- PCV3-associated disease was diagnosed in 2 cases from nursery pigs and in 1 abortion case with compatible histologic lesions (lymphocytic arteritis / periarteritis), and PCV3 detection by PCR with relatively low Ct value. PCV3 in situ hybridization (ISH) was pursued in 1 nursery pig and 1 abortion case, and PCV3 nucleic acid was detected in association with lesions in both cases. The increase in PCV2 and PCV3 positive cases in 2020 may, in large part, reflect increased testing frequency.
- S.equi ssp zooepidemicus was not isolated from any swine cases in Q4.
- Detection of F4/K88 E.coli and colibacillosis diagnosis was similar to that in Q3 and was increased over the first half of 2021 and in all of 2020. In a group of finishers with profuse watery diarrhea, colibacillosis due to F18 ETEC was diagnosed based on histopathology findings (adherent bacilli in small intestine) and genotyping of E.coli isolates from intestine.
- The number of abortion submissions and distribution of etiologic diagnoses have remained relatively constant over the past 2 years.
- Necrotizing tracheitis was diagnosed in 2 cases, and the lesion had been identified on gross exam (field PM) in 1 case. Fresh trachea was not submitted for testing in either case.

NONPATHOLOGY CASES
There was nothing remarkable in Q3 with respect to non-pathology cases.

PATHOLOGY TAKE HOME MESSAGES FROM Q4 2021
1. Case definition of PCV3-associated diseases should help practitioners decide if diagnostic findings are significant. Clinical, histopathological, and molecular / ISH components (Saporiti V et al, Transboundary and Emerging Diseases, 2021. 68: 2936-2948)
2. Colibacillosis can occur in finishers. It is not common, but possible. Histopathology, bacterial culture from intestine, and genotyping (ETEC, VTEC) of E.coli isolates are needed for diagnosis.
3. Please open the trachea and evaluate the mucosa as a routine part of any necropsy. Lung is not a reliable surrogate for trachea when testing for potential infectious cases of tracheitis. Include fresh tracheal samples for testing in cases with tracheal lesions.
4. Please include a description of gross lesions in the clinical history on submission forms (quantity ≠ quality). “Help us to help you!”
5. Please do include a sample of fresh spleen with submissions from ALL field necropsies or investigations. The fresh spleen sample is required for CanSpotASF surveillance testing which will occur if case inclusion criteria are met. Please indicate on the submission form that spleen is included for ASF surveillance testing.

Gallant Custom Laboratory Diagnostic Reports

Anna Pietruszkiewicz summarized the report on the 7 cases submitted to Gallant Labs from Ontario in Q4 2021. The number of cases was lower in Q4 than the 50 cases submitted in Q1 2021, 48 cases submitted in Q2 2021 and 24 cases submitted in Q3 2021.
- Influenza A – 1 isolation of an H1N2 , 1 isolation of an H3N2 and 4 isolations of H1N1.

Slaughter Statistics

Federal Slaughter Statistic Summary (Q4 Aggregate)

Dr. Christine Pelland reported the following:

Carcass Condemnations

- Total number of hogs slaughtered in Q4 2021 = 1,077,968 with 2,231 carcasses condemned.
- Percent of carcasses condemned in Q4 2021 = 0.21% compared to Q1 2021 = 0.24%, Q2 2021 = 0.21% and Q3 2021 = 0.19%
- Abscesses, Peritonitis and Enteritis continue to be the 3 most common reasons for entire carcass condemnations.

Comment: Erysipelas is continuing to follow the seasonal patterns identified in 2019 and 2020. Once again condemnations for Erysipelas were highest in Q1 and Q4 2021 with Q2 and Q3 at lower levels.

Trim Demerit Condemnations:

- Total number of carcasses that were subject to trim loss in Q4 2021 = 28,477 hogs. (2.64% of carcasses inspected in Q4 were subject to trim demerits. This compares to 2.67% of carcasses inspected in Q3 2021.)
- Total weight of trim in Q4 2021 = 154,982 kg with an average trim weight of 5.44 Kg / animal trimmed. Total weight of trim in Q3 2021 = 142,609 kg with an average trim weight of 5.2 kg/ animal trimmed.

Total number of carcasses that were subject to trim loss due to abscess in Q4 2021 = 17,346 carcasses with a total trim weight of 114,338 kg and an average trim weight of 6.59 Kg / animal trimmed. Comment: Trim frequency and total weight of trim lost (kg) due to abscess continues to be the most significant cause of trim loss.

Ontario Provincial Slaughter Statistic Summary

Dr. Christine Pelland reported there were no significant changes in the provincial statistics.

CanSpotASF Surveillance Update

Drs. Pasma and Fairles provided an update on CanSotASF activity in Ontario.

CanSpotASF is a risk-based early detection testing program that is available at approved Canadian animal health laboratories There is no change for any case that arises where ASF is suspected. As always these cases must be immediately reported to the local Canadian Food Inspection Agency (CFIA) district office.

Approved laboratories that are part of the CAHSN network can now do ASF testing on cases where you may want to rule-out ASF –just to be on the safe side. This rule-out testing is targeted at herds with endemic diseases that could mask ASF and therefore delay detection. Both herd veterinarians and pathologists can initiate ASF rule-out testing. Practitioners can request rule out testing even if not submitting samples for histology. Some abattoir submissions to CanSpot are just starting.
What cases are eligible for risk-based early detection?

Certain diseases/conditions have been shown to mask the clinical signs associated with ASF and delay detection. Herds with a history of these diseases/conditions, or cases with a compatible clinicopathological presentation are eligible for testing. This could include septicemia, multiorgan hemorrhage such as caused by E.rhusiopathiae; S.suis; S. zooepidemicus; A.suis; S. cholerasuis etc Porcine Reproductive and Respiratory Syndrome virus (PRRS), especially when it causes cyanotic skin. Porcine Dermatitis and Nephropathy Syndrome (PDNS) and vasculitis that can be caused by PCV 2, PCV 3 or other pathogens. Hemorrhagic diarrhea / necrotizing enterocolitis such as caused by Salmonella spp; L. intracellularis; B. hyodysenteriae; B. hampsonii Fibrinous pleuritis / pericarditis / hydropericardium such as caused by H. parasuis; S.suis, Mulberry heart disease Splenic torsion, Abortion above historical trend for herd or Mortality above historical trend for herd It is important to include fresh spleen with your diagnostic samples i to carry out the ASF testing. Formalin fixed tissues cannot be tested in this program. Sampling in Ontario is a bit low compared to other Canadian regions, so the goal is to increase the number of samples submitted.

Ontario Veterinary College Research Update

Dr. Bob Friendship updated on some recent research activity on Post-weaning Diarrhea at Arkell research station. Each month 3 pens with 10 / pen were enrolled in a new replicate of treatments and control. Vaccines, proteobiotic and dietary changes are examined. Disease challenge is created by reducing sanitation and decreasing room temperature more or less like the real world. Vaccines have not shown benefits in these studies. Proteobiotics have shown some response at high levels. Reduced density diets did not provide control and made the pigs grow more slowly. One of the conclusions of these studies is that often the pathogen is necessary to have the disease but the presence of the pathogen is not necessarily sufficient to cause disease. Multiple etiological agents being concurrently present in the animals at the same time can make responses more variable.

International Disease Surveillance Topics

Dr. Al Scorgie commented on some interesting international disease surveillance reports

Pigs and Covid-19
A number of studies done since the pandemic started have shown that pigs can be infected by Covid19 if exposed to high doses. However, in pigs the infection is self-limiting. Pigs do not show clinical signs. Pigs do not transmit the virus to other animals. Two researchers at Iowa State, Dr. R Nelli and Dr. L Gimmencz-Lirola investigated why Covid19 is self-limiting in pigs. The researchers introduced the virus to cultured porcine and human respiratory epithelial cells. When pigs cells were infected they underwent apoptosis or controlled cell death. Under the microscope, the nuclei of infected pig cells starts to shred. If apoptosis happens early in the infection there is minimal tissue damage and viral replication is limited. Infected human cells are more likely to go through necrosis, another form of cell death. When a cell undergoes necrosis the contents of the cell are released into the surrounding space, which triggers a hyperimmune response. During apoptosis the cell death is more controlled and a hyperimmune response is not triggered. Apoptosis disposes of infected cells quickly without having a hyperimmune reaction. The researchers do not know why pig cells react this way. Likely, the response is intrinsic to the pig's immune system. Further research may help design therapies that could trigger apoptosis in human cells and reduce severe symptoms in people.

Source: Vincent ter Beek, Pig Progress

African Swine Fever
Italy - On January 07th 2022, Italy reported a case of ASF in a wild boar found dead in the Piedmont region. Since the first reported case, another 6 cases have been identified. All cases are in the Piedmont region in Northwestern Italy. Italy has established infected and surveillance areas. Although the island of Sardina, which is part of Italy is endemic for genotype I. genotype II was found in the Piedmont region. The nearest region with an ASF genotype II outbreak is 800km away in Germany. The Piedmont region has a growing wild boar population.

Source: Pig Progress 01/10/22

Europe and the Caribbean - The Dominican Republic is continuing to see cases of ASF with the latest case reported in December 2021. Since the first case of ASF was reported in April 2021, the country has reported 199 cases, involving 15,500 pigs. Most of the cases are reported as "backyard" farms with a herd size of up to 300 pigs. Haiti has reported no new cases since mid-October 2021. In Europe, Latvia, Romania, Hungary, Ukraine, and Russia continue to have cases of ASF in wild boars. In Germany the number of cases in wild boars is over 3,000. All the cases in Germany are in three states along the border with Poland. Romania continues to report cases of ASF in domestic pigs. Most of the cases are smaller, backyard farms but a large commercial farm was also infected.

Source: CEZD 12/20/21 – 01/02/22

International Disease Surveillance Topics Continued …

Will ASF Keep Moving West in Europe? - It appears that the general direction of wild boar movement in Europe is west. ASF spread from Russia to Belarus, from Belarus to Poland, from Poland to Germany. In some areas of Europe, the wild boar population is growing significantly. Some possible reasons are changes to large-scale grain cultivation that gives wild boars a steady food source and a good place to survive. Another theory is that there is less hunting pressure. Some studies done in Poland, estimate that ASF moves 3 to 5km per month. When ASF moves longer distance this is likely because of human activity. ASF took 1 year to cross Belarus into Poland. Initial estimates were that ASF would cross Poland in 1 year. It took 7 years to cross Poland. In part this may be because of the control measure Poland put in place. Active surveillance of dead wild boars is essential to understand the spread. Dead wild boars are a better source for testing than live wild boars. One interesting observation is wild boars hit by cars often test negative for ASF. When ASF enters a region the number of wild boars hit by cars drop because infected boars are febrile and do not move far.

Source: pig333.com 11/16/21

ASF Genotype I Reported in China - Genotype I is the strain of ASF that is currently endemic on the island of Sardina. ASF Genotype I was introduced into Europe in 1957 into Portugal. From Portugal, ASF Genotype I spread to Spain, France, Belgium and other European countries. By the mid-90's the outbreak in Europe was declared over. In 2007, ASF Genotype II entered Georgia. Genotype II is a more virulent strain. ASF Genotype I has been identified in Henan and Shandong province. In Henan province the Genotype I was isolated from four finisher pigs that had chronic infections (weight loss, intermittent fever, skin lesions and arthritis). In Shandong province the Genotype I was isolated from a finisher with signs of paralysis. Researchers at the Harbin Veterinary Research Institute found that the 2 genotypes are highly similar to genotype I viruses isolated from Portugal in 1968 and 1988. The researchers found that the strains were of low virulence, caused a mild onset of disease and the condition could become chronic. One concern is that cases of ASF Genotype I could be missed early in the disease because of the reduced virulence. The source of Genotype I in China is unknown. Speculation is that because of the close similarity to the Portugal strain there was illegal importation from Europe. There is no cross protection between Genotype I and II.

Federal Agents Seize Illegal Meat Imports - USDA inspectors seized more than 1,900lb of prohibited pork, poultry and ruminant products from New York City area-retailers. The illegal products were seized between October and December 2021. The products were sourced from China. The USDA has a Smuggling Interdiction and Trade Compliance (SITC) program. In 2021, SITC seized 224,568 pounds of prohibited agricultural items.

International Disease Surveillance Topics Continued …

Pseudorabies
In early September 2021, Colorado Parks and Wildlife officers confiscated three feral swine being raised on a small farm in El Paso County, Colorado. The owner had illegally imported the feral swine from Texas. The three pigs were euthanized. Testing shows that the pigs were positive for pseudorabies. In 2005, Colorado State created a task force to eradicate feral swine. Initially, the state tried to eradicate the feral swine through hunting. The next step involved live trapping and euthanasia, using corral-like traps, some aerial hunting and a campaign to encourage the public to report sightings of feral pigs. Parks and Wildlife officers were trained on identifying signs of feral pigs. Data was gathered on locations, types of pigs and numbers. USDA also collect water samples to test for the presence of DNA from wild pigs. Trail cameras were also set up. After 15 years, the state announced it had eradicated feral pigs.

Source: Pork 01/06/22

SHIC – Funded Infectious Aerosols Biocontainment Project
Swine Health Information Center (SHIC) is funding a project by the University of Minnesota to look at methods of biocontainment to prevent the spread of infectious bioaerosols. Different methods of biocontainment have been identified including: fibrous filtration, ionization, ultraviolet light, electrostatic precipitation, microwave, photochemical oxidation and air filters coated with antimicrobial properties. Experts from the U of Minnesota Veterinary College and College of Sciences and Engineering will first review all the literature on the different forms of biocontainment. Another group will assist with the selection and evaluation of the different technologies. This group will also assess the possible application to swine.

Source: January 2022 SHIC newsletter

Dr. Sue Burlatschenko commented on some interesting coronavirus research
A report in Nature looked at samples in school children in Haiti. Three samples from these children were positive after amplification for coronavirus that clustered with Porcine Deltacoronavirus (PDCoV). One sample clustered with a clade from China and one clustered with a clade from the US. For the two kids with the same strain it looked like two separate zoonotic events or an initial zoonotic event followed by human to human transmission. Illness was mild so these PDCoV are not likely a major human health threat. SARS-Cov-2 can cause some signs of diarrhea.

How can you Participate in OAHN?

Look for the 2022 Q1 veterinary clinical impression survey that will come out the first of January 2022 via an email through the OASV listserv.
The survey takes less than 10 mins time to complete!

Contact Us!

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