



## Science Works Feverishly to Diagnose ASF

By Geoff Geddes for Swine Innovation Porc | July 29, 2021



*Dr. Aruna Ambagala (above right) from the National Centre for Foreign Animal Diseases in Winnipeg (above left) spoke during Swine Innovation Porc's webinar held in January 2021. Photos: NCFAD ([www.science.gc.ca/eic/site/063.nsf/eng/97704.html](http://www.science.gc.ca/eic/site/063.nsf/eng/97704.html))*

As the world scrambles to address COVID-19, it is another scary disease, African swine fever (ASF), that is turning up the heat on the hog sector. A serious viral disease of pigs that can cause fever, internal bleeding and high death rates, ASF is extremely contagious, spreading rapidly through both direct and indirect contact with infected pigs or pig products. Though there is a concerted effort to keep it out of Canada, such was the case with COVID-19, and we know how that turned out. In helping industry prepare for a worst case scenario, Dr. Aruna Ambagala presented a talk on “Diagnosis of ASF using Alternative Sample Types” as part of SIP’s webinar “African Swine Fever: How is Canada Getting Prepared?” at the 2021 Banff Pork Seminar.

With any virus, diagnosis is critical, and that is doubly true with a disease like ASF that can be hard to spot on farm. Though Canada has cutting edge diagnostic tools, the danger from the virus, and the ambiguous clinical signs that often accompany it, have scientists focused on continuous improvement.

“We have two options when it comes to ASF diagnosis,” said Dr. Aruna Ambagala, a research scientist with the Canadian Food Inspection Agency (CFIA) at the National Centre for Foreign Animal Disease (NCFAD) in Winnipeg. Dr. Ambagala is head of the Mammalian Disease Unit and World Organisation for Animal Health (OIE) Reference Lab for Classical Swine Fever at the NCFAD. “We can either look at the virus itself, or at the antibodies to the virus.”

When looking for the genomic material of ASF virus, scientists use a real-time PCR screening test available at the NCFAD and at labs that are part of the Canadian Animal Health Surveillance Network (CAHSN). [The CAHSN is a network of federal, provincial, and university animal health laboratories across Canada].

## Testing Time

The PCR test, which requires two to four hours to complete and review, can be employed in ongoing outbreaks to detect ASF in pigs. Following this test, additional tests will be performed at the NCFAD to confirm the results.

“If a pig is dead, we request a full post-mortem and submit tissue samples such as tonsils, spleen, liver, kidney or lung,” said Dr. Ambagala. “The most important sample for detection of ASF and other viruses like classical swine fever are the tonsils, and bone marrow is requested if the carcass is decomposed.”

For the antibody option, which is used to find evidence of past virus exposure, an ELISA based test is carried out to spot the antibodies in serum samples months or years after infection. ELISA (enzyme-linked immunosorbent assay) is an immunological assay commonly used to measure antibodies, antigens, proteins and glycoproteins in biological samples.

Given some limitations to the ELISA based test, additional tests using whole blood or serum samples must be done to confirm the results.

Surveillance based on individual animal sampling can come at considerable expense and increased labour requirements, as each pig must be handled separately, or a full post-mortem completed. In an attempt to ease that burden, researchers on this project examined alternative sample types for live groups of animals and herds with high mortality.

“For group samples, we are looking at oral fluids and processing fluids. In the case of samples from carcasses, we need ones that can be collected quickly and safely from dead pigs without a full post-mortem, such as lymph nodes accessible through the skin, skin biopsies, ear notches, ears and meat swabs.”

## The facts on fluids

As a mode of sampling, oral fluids have several advantages. They are a rich sample that is easy to collect, as producers can simply hang a rope from the ceiling and wait for pigs to chew on it. Oral fluids have proven effective for detection of PRRSV [Porcine reproductive and respiratory syndrome virus], PCV2 [Porcine circovirus type 2] and SIV [Swine influenza virus]. Last, but certainly not least, they can be collected in a manner that is humane and non-invasive.

Of course, testing with oral fluids needs to be validated for accuracy before it can be widely used. To that end, the NCFAD is assessing the effectiveness of these fluids for early ASF detection in a project with the Plum Island Animal Disease Center of New York.

“We inoculated four pigs in a pen with ASF and found we could identify the oral fluid before the animals showed real clinical signs. We then repeated that experiment on a larger scale with similar results.”

Since more validation is always better in scientific circles, field evaluations are planned for Vietnam, as well as more lab testing here at home.


“We are also looking in more detail at the diagnostic sensitivity, specificity and measurement of uncertainty of the oral fluid samples. We are trying different instrumentation and technicians, and, because these samples can be tricky to work with, we are planning to conduct a reproducibility experiment where we test the same oral fluid samples at two labs to ensure our detection is accurate.”

Science is all about collaboration, and this project is no exception. Working to enhance the effectiveness of ASF detection in oral fluids, Dr. Ambagala and colleagues are teaming up with Iowa State University. They also want to gauge the effectiveness of commercial PCR kits to spot ASF in oral fluids, and will partner with Kansas State University to drive that effort.

The other option being considered for ASF detection is processing fluid, which is collected during castration and tail docking.

“With processing fluids, we are targeting breeding herds and suckling pigs, two groups that are not well suited to oral fluid testing because they won’t go after the rope that is used to collect the fluids. If we can target these groups with this sample type, we will expand our ability to screen our swine herds, and to do so with much less strain on producer finances and human resources.”

To offer veterinarians a third choice to replace complicated post-mortem sampling, scientists are investigating alternative sample types.

Research continues on practical, affordable ways to diagnose ASF, but until there is a viable vaccine, alternative sample types may be our best shot. 

## Video available!

[Click here to watch a recording of our webinar “African swine fever: How is Canada getting prepared?”](#) that was held on January 6, 2021.

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