COUNTRY REPORT
PHILIPPINES

Regional Workshop on Swine Disease Diagnosis
Beijing, P. R. China, 30 – 31 Oct 2019

WORLD ORGANISATION FOR ANIMAL HEALTH
Protecting animals, preserving our future
The PHILIPPINES

3 Island Groups
Luzon (north)
Visayas (central)
Mindanao (south)

17 Administrative Regions

<table>
<thead>
<tr>
<th>Region</th>
<th>Provinces</th>
<th>Cities</th>
<th>Municipalities</th>
<th>Barangays</th>
</tr>
</thead>
<tbody>
<tr>
<td>LUZON</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central Luzon</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV-A Calabarzon</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV-B Mimaropa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VISAYAS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central Visayas</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VII</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MINDANAO</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northern Mindanao</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARMM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Autonomous Region in Muslim Mindanao</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As of 31 December 2018
Swine production in the Philippines is a P263-billion industry and is the largest among the livestock and poultry industries of the country. It ranks next to rice with 18.28% contribution to the total value of agricultural production. Swine production plays a major role in ensuring the country’s food security by providing about 60% of the total animal meat consumption of Filipinos. The Philippine swine industry is ranked eighth in the world in terms of the volume of pork production and number of breeding sows. Majority or about 65% of the pigs in the Philippines are kept by small hold pig raisers.

(DOST-PCCARD)
## Basic information

### PIG POPULATION

<table>
<thead>
<tr>
<th>Item</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backyard</td>
<td>7,959,930</td>
<td>8,120,087</td>
<td>8,092,940</td>
</tr>
<tr>
<td>Commercial</td>
<td>4,518,781</td>
<td>4,307,703</td>
<td>4,511,501</td>
</tr>
<tr>
<td>TOTAL</td>
<td>12,478,711</td>
<td>12,427,790</td>
<td>12,604,441</td>
</tr>
</tbody>
</table>

*(Philippine Statistics Authority)*
Basic information

National Laboratory System/Network

BAI-ADDRL provides Laboratory Support

- Disease Outbreak Investigation
- Disease Monitoring and Surveillance
- Quarantine
- Swine Breeder Accreditation
- Researches on Swine Diseases - Local/Int’l
Bureau of Animal Industry

Organizational Structure

Office of the Director (OD)

- Animal Feeds Veterinary Drugs and Biologics Control Division (AFVDBCD)
- Animal Health and Welfare Division (AHWD)
- Livestock Research and Development Division (LRDD)
- National Veterinary Quarantine Services Division (NVQSD)
- Veterinary Laboratory Division (VLD)

- Veterinary Quarantine Stations (VQS)

- National Swine and Poultry Research and Development Center (NSPRDC)
- National Beef Cattle Research and Development Center (NBCRDC)
- National Feed Resources Research and Development Center (NFRRDC)
- National Small Ruminants Research and Development Center (NSRRDC)

- NBCRDC I
- NBCRDC II
National Laboratory System/Network

- Technical assistance to 15 Regional Animal Disease Diagnostic Laboratories (RADDLs)
- Philippine Animal Health Information System (Philahis)
- SEACFMD Laboratory Network
- Participation in the CSIRO-AAHL Proficiency Testing for PRRS, CSF, ASF & SIV
## Updates on disease situation

### Serological Test for PRRS (Porcine Reproductive and Respiratory Syndrome)

<table>
<thead>
<tr>
<th>Year</th>
<th>Samples Tested</th>
<th>Samples Tested positive</th>
<th>Year</th>
<th>Samples Tested</th>
<th>Samples Tested positive</th>
<th>Year</th>
<th>Samples Tested</th>
<th>Samples Tested positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>1883</td>
<td>958</td>
<td>2017</td>
<td>3011</td>
<td>1347</td>
<td>2018</td>
<td>2946</td>
<td>1328</td>
</tr>
<tr>
<td></td>
<td>50.88%</td>
<td></td>
<td></td>
<td>44.74%</td>
<td></td>
<td></td>
<td>45.07%</td>
<td></td>
</tr>
</tbody>
</table>

(Animal Disease Diagnosis and Reference Laboratory)
### Updates on disease situation

#### Molecular Test for PRRS (Porcine Reproductive and Respiratory Syndrome)

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Tested</td>
<td>Sample Tested positive</td>
<td>Sample Tested positive</td>
</tr>
<tr>
<td>253</td>
<td>65</td>
<td>403</td>
</tr>
<tr>
<td></td>
<td>25.70%</td>
<td>20.6%</td>
</tr>
</tbody>
</table>

(Animal Disease Diagnosis and Reference Laboratory)
## Updates on disease situation

**Serological Test for CSF (Classical Swine Fever)**

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Tested</td>
<td>Sample Tested positive</td>
<td>Sample Tested</td>
<td>Sample Tested positive</td>
</tr>
<tr>
<td></td>
<td>634</td>
<td>150</td>
<td>699</td>
</tr>
</tbody>
</table>

- **2016:** 23.66%
- **2017:** 26.32%
- **2018:** 32.97%

(Animal Disease Diagnosis and Reference Laboratory)
# Updates on disease situation

## Molecular Test for CSF (Classical Swine Fever)

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Tested</td>
<td>3</td>
<td>94</td>
</tr>
<tr>
<td>Sample Tested positive</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Percentage</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

(Animal Disease Diagnosis and Reference Laboratory)
# Updates on disease situation

Molecular Test for PED (Porcine Epidemic Diarrhea)

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Tested</td>
<td>Sample Tested positive</td>
<td>Sample Tested</td>
</tr>
<tr>
<td>2017</td>
<td>24</td>
<td>17</td>
</tr>
<tr>
<td>2018</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>%</td>
<td>12.5%</td>
<td>0%</td>
</tr>
</tbody>
</table>

(Animal Disease Diagnosis and Reference Laboratory)
Foot & Mouth Disease (FMD)

To date...
The Philippines is FMD-free!
Foot & Mouth Disease (FMD)

- The Philippines has maintained its Foot & Mouth Disease free status since 2011.
- To date, the country has no incidence of FMD since the last reported outbreak in 2005.
Serological Test for FMD (Foot and Mouth Disease)

<table>
<thead>
<tr>
<th></th>
<th>2018 Sample Tested</th>
<th>2018 Sample Tested positive</th>
<th>2019 Sample Tested</th>
<th>2019 Sample Tested positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWINE</td>
<td>2537</td>
<td>0</td>
<td>2159</td>
<td>0</td>
</tr>
<tr>
<td>Other spp (Bovine, Caprine and Ovine)</td>
<td>4461</td>
<td>0</td>
<td>3423</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>6998</td>
<td>0</td>
<td>5582</td>
<td>0</td>
</tr>
</tbody>
</table>

(Animal Disease Diagnosis and Reference Laboratory, 2019)
## Updates on disease situation

### Molecular Test for African Swine Fever Surveillance *

<table>
<thead>
<tr>
<th>Confiscated Meat</th>
<th>(January – June 2019)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Samples Tested</td>
<td>Samples Tested positive</td>
</tr>
<tr>
<td>400</td>
<td>34</td>
</tr>
<tr>
<td>8.5%</td>
<td></td>
</tr>
</tbody>
</table>

* Before the outbreak

(Animal Disease Diagnosis and Reference Laboratory)
Confiscated samples from Inbound Travelers

- January (Ene)
- February (Peb)
- March (Mar)
- April (Abr)
- May (Mayo)

- Negative
- Positive
Updates on disease situation

African Swine Fever

- On September 9, 2019 the Department of Agriculture notified OIE of the first occurrence of ASF in the country.
- Initial case reported to the Bureau of Animal Industry (BAI) on August 13, 2019 but deaths in pigs in a backyard farm in Rodriguez, Rizal were already observed on July 25, 2019.
- Clinical signs observed: petecchial hemorrhages on the skin, high fever, inappetence, unable to walk, then death.
- Tissue samples and serum samples from affected pigs were submitted and tested positive for ASF viral DNA using ASF Taqman PCR assay (source: AAHL protocol based on King, et al, 2003).
Updates on disease situation

African Swine Fever

- Second case reported to the Bureau of Animal Industry (BAI) on August 20, 2019 but deaths in pigs in a backyard farm in another municipality in Antipolo, Rizal were already observed on August 7, 2019
- Clinical signs observed: Fever, inappetence, incoordination, conjunctivitis, premature birth with mummified fetuses
- Tissue samples from affected pig was submitted and tested positive for ASF viral DNA using ASF Taqman PCR assay
- Blood samples from apparently healthy pigs from a stockyard ready for slaughter in a province in Luzon were submitted and also tested positive for ASF viral DNA using ASF Taqman PCR assay
- Twenty samples were submitted to the Pirbright Laboratory for confirmatory testing
# Updates on disease situation

## Molecular Test for African Swine Fever

(August-October 18, 2019)

<table>
<thead>
<tr>
<th>Samples Tested</th>
<th>Samples Tested positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>6,616</td>
<td>319</td>
</tr>
</tbody>
</table>

4.82%

(Animal Disease Diagnosis and Reference Laboratory)
Swine diseases diagnosis
Diagnostic capacity of ADDRL

• Serology
  Enzyme Linked Immunosorbent Assay (ELISA)
  Antibody detection test
  Antigen detection test

• Molecular Test
  Realtime PCR
  Conventional PCR
Swine diseases diagnosis
Tests for Major Swine Diseases

- **Realtime PCR Assay**
  - ASF, PRRS, PRV, CSF, SIV, PED, TGE, FMD, PCV2 and RESTV
- **ELISA– Antigen detection**
  - CSF
- **ELISA– Antibody detection**
  - PRRS, PRV, CSF, SIV, PED, TGE, FMD and RESTV
Swine diseases diagnosis

Results and Analysis for ASF
(The Pirbright Institute)

- 14/20 samples submitted to the Pirbright Lab were confirmed to be positive for ASF by ASF PCR and UPL PCR

- 6/20 samples which tested positive for PCR were also positive in the virus isolation
Swine disease diagnosis

Results and Analysis for ASF
(The Pirbright Insitute)

• Phylogenetic analysis was performed on seven isolates and these were found to have identical p72 gene sequence
• The phylogenetic tree is unrooted hence its ancestral lineage cannot be assumed
• Same samples shared 100% identical p72 sequence with China 2018, Zambia 1991, Madagascar 2003 and Poland 2014 strains
• These sequences were classified as Genotype 2
Epidemiology Report

Comparison of 401 bp of the p72 gene

[Diagram of genetic relationships]

Result should not be reproduced except in full without the consent from The Pirbright Institute. The sample profile generated as a result of phylogenetic analysis relate to only that sample.
Swine disease diagnosis

Results and Analysis for ASF
(The Pirbright Institute)

- Phylogenetic analysis was performed on six isolates and these were found to have identical p54 gene sequence.
- The phylogenetic tree is unrooted hence its ancestral lineage cannot be assumed.
- Same six samples shared 100% identical p54 sequence with China 2018, Belgium 2018, and Georgia 2007.
- These sequences were classified as Genotype 2.
Swine disease diagnosis

Results and Analysis for ASF
(The Pirbright Institute)

• Sequences of the four isolates were 100% identical across the intergenic region I73R and I329L genes
• These had the insertion of 10 additional nucleotides (nt) in comparison to ASFV Georgia 2007/1
• Same 10 nt insertion were observed in other Genotype II strains such as: China 2018, Belgium 2018, Estonia 2014, Russia 2015 and Ukraine 2016
Epidemiology Report

Partial nucleotide sequence alignment of the intergenic region between 173R and 1329L genes

Analysis performed by:

Dr Paulina Rajko-Nenow  
Date: 2019.09.25 16:02:12 +0100

Results Approved by:

Dr John Flannery  
2019.09.26 08:34:32 +0100

If further information is required concerning these results please contact Dr Carrie Batten, Head of Non-Vascular Reference Laboratories, tel +44(0)1483 231344, e-mail carrie.batten@pirbright.ac.uk

Result should not be reproduced except in full without the consent from The Pirbright Institute. The sample profile generated as a result of phylogenetic analysis relates to only that sample.
What worked well

• Previous trainings by FAO, OIE, IAEA on the use of Taqman PCRs for swine disease diagnosis including ASF in the past had helped in capacitating the lab and preparing for ASF diagnosis.

• Participation in the annual Proficiency Testing by AAHL/FAO since 2012 contributed a lot in gaining good efficiency and confidence in performing Taqman PCR assays.

• Laboratory networking helped the lab in having access to the different standard protocols that we can use should our protocol does not work.
The winning side of the outbreak

- Diminished damage
- Amazing cooperation
- Rapid response
- National awareness
- Abandonment of bad husbandry
## Challenges and possible solution

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influx of samples for ASF / differential diseases diagnosis at the National Laboratory (ADDRL)</td>
<td>Capacitate the Regional Laboratories thru on site training and providing technical and financial assistance</td>
</tr>
<tr>
<td>Lack of capability to do virus isolation or other test methods such as FAT, etc</td>
<td>Collaborate with regional/reference labs for conduct of training</td>
</tr>
<tr>
<td>Lack of manpower and resources</td>
<td>Elevate problem to authorities</td>
</tr>
<tr>
<td>Prevent further spread to other provinces</td>
<td>Early detection and rapid response</td>
</tr>
</tbody>
</table>
Where are you today?

Disease Control Measures

- Locate, hold and cull
- Improve surveillance and reporting
- Educate stakeholders
- Mobilize Supporters
- Protect free zones
- Optimize bio-security

Recovery
THANK YOU FOR YOUR ATTENTION!