AFRICAN SWINE FEVER (ASF)

Standard Operating Procedure (SOP) for Meghalaya

Introduction

African swine fever (ASF) is a highly contagious economically devastating hemorrhagic viral disease of pigs, warthogs and wild boar with high rates of morbidity and mortality. First described in the 1920s in Kenya, ASF is listed by the World Organization for Animal Health (OIE) as a notifiable disease. Until the last few years, outbreaks were confined to eastern and southern Africa and Sardinia. However, outbreaks in the Caucasus region and Russia have begun to spread to Eastern Europe and pose a great risk for further spread to other European Union countries. Meghalaya shares 443 Kms international border and 884.9 Kms interstate of Assam-Meghalaya border and unusual mortality of pigs currently reported in Assam and Arunachal Pradesh, it is imperative to initiate a state of preparedness in Meghalaya.

ASF does not pose a risk to public health (There is No zoonotic implications).

Virus Characteristics

According to the International Committee on Taxonomy of Viruses, African swine fever virus (ASFV) is categorized as follows:

- Family: *Asfarviridae*
- Genus: *Asfivirus*

ASFV is an enveloped virus, 200 nm in diameter with a linear, double-stranded DNA genome that encodes 160 to 175 genes. It has distinctive morphology, characterized by the dense 80 nm virion core that is composed of the viral genome and an icosahedral capsid, covered by an internal lipoprotein envelope. The outer envelope is derived through the budding process from the cellular membrane of infected cells.

Resistance of ASFV to Physical and Chemical Action

The virus is highly resistant to low temperatures. It is heat inactivated by 60^0C for 20 minutes and inactivated by pH < 3.9 or > 11.5 in serum-free medium. The virus is susceptible to ether and chloroform, and inactivated by 2% sodium hydroxide, hypochlorites-2.3 percent chlorine (30 minutes), 1% formalin (30 minutes), 3 percent ortho-phenylphenol (30 minutes) and iodine compounds.

ASFV remains viable for long periods in blood, feces, and tissues; especially infected uncooked or undercooked pork products.

ECOLOGY

Susceptible Species: Pigs of all age group are susceptible to the disease, including all members of the pig family (Suidae):

- Domesticated swine (*Sus domestica*) and Wild boars (*Sus scrofa scrofa)*
- Warthogs (*Phacochoerus* spp.) and Bush pigs (*Potamochoerus porucs*)

TRANSMISSION:

1. **DIRECT:** The virus may spread through direct contact via the oro-nasal route after contact with excretions from infected pigs, through ingestion of pork or other contaminated products. This transmission route requires the existence of large, continuous populations of pigs for the virus to remain in circulation.

   The virus is shed in saliva, tears, nasal secretions, urine, faeces, and secretions from the genital tract. Blood, in particular, contains large amounts of virus.

   The introduction of new pigs into a herd or piggery often results in individuals fighting and biting each other. In the case of free-ranging or scavenging animals, infection can result from contact with infected roaming pigs, wild boar (sylvatic cycle), their carcasses, or food leftovers. Additionally, using the same needle to vaccinate or treat several pigs can transmit the virus.

2. **INDIRECT:** Indirect transmission through contaminated feed and fomites. The virus is transmitted from one farm to the next almost exclusively due to human intervention, e.g. movement of animals or equipment, the feeding of infected materials, etc. Pigs can therefore become infected by contact with many different infected sources, mainly infected pigs, pork, and other pig-derived products (e.g. swill), and fomites (e.g. bedding). These infected animals and contaminated materials can be transported over long distances by vehicles and people.
3. **VECTOR-BORNE TRANSMISSION:** Transmission through soft tick (Ornithodorus ticks) in tick-pig cycle.

INCUBATION PERIOD: The incubation period represents the time from infection (i.e. when the virus enters the animal) to disease (i.e. when the animal shows clinical signs). For ASF, it is between four and 19 days, depending on the virus, host and route. Virus excretion can begin up to two days prior to the appearance of clinical signs.

CLINICAL SIGNS:

Sl.no.	Forms	Clinical signs
1.	Acute Form	- Fever (42^0C), anorexia, listlessness, cyanosis, incoordination, increased pulse and respiratory rate, leukopenia and thrombocytopenia (at 48–72 hours), vomiting, diarrhea, and abortion in pregnant sows. - Any survivors become carriers for life.
2.	Sub-Acute Form	- Slight fever, reduced appetite, and depression. - Abortion in pregnant sows is also possible and can be an early sign.
3.	Chronic Form	- Weight loss, irregular temperature spikes, respiratory symptoms, necrosis of skin, chronic skin ulcer, arthritis, pericarditis and swelling of the joints. Pigs with chronic ASF will experience recurring episodes of acute disease, which could eventually lead to death.

PREVENTION AND CONTROL

- Immediate quarantine of infected and suspected farms until diagnosis is confirmed.
- Establish disinfection points at entrances and exits of the pig farm/pig sty. Foot dip with disinfectant should be made mandatory at the entry point of each pig shed. Pig shed should be disinfected daily with 1% formaldehyde or 2% NaOH or paraphenylphenolic disinfectants.
- Personnel and visitors leaving the farm should ensure that shoes, clothing and equipment are disinfected.
- Pigs should not allow them to comingle with other pigs, wild boar and other animals.
- No diseased pigs should be sold to traders/ butchers. Stringent environment friendly measures should be adopted for proper disposal of farm waste.
- Proper disposal of dead carcass with deep burial of 6 feet deep using lime/bleaching powder.
- Purchase of new pigs from known sources only. Newly purchased pigs/ piglets should be housed separately in quarantine shed for about 4 weeks.
- Swill feeding should be restricted and if practiced, it should be boiled properly before feeding.
- Farm utensils used for feeding of diseased pigs should not be used for feeding of healthy pigs.
- Movement of animals from one household to another/ animal fairs should be strictly prohibited.
- Movement of personnel (veterinarians and farm workers) from one farm premises to another is prohibited. No visitor should be allowed to go inside the farms.
- Management of animal health including regular deworming and minerals and vitamins supplements.
- If any pig suffers from disease, it should immediately be separated from the healthy stock and should be reared in quarantine shed till it is fully recovered.
- Proper record keeping of animal health and entry and exit of visitors should be maintained.
- Any suspected cases of ASF should be immediately reported to Veterinary doctors and to the District Veterinary Officer.

Including and apart from the above advisory mentioned, field veterinary officers may note the following for necessary actions:

- Undertake clinical inspection of each farm subunit, clinical examination of selected animals and necropsy of dead (or euthanized) animals. When conducting a clinical examination of suspect animals, it is important to be systematic.
- Appropriate samples should be collected and sent as soon as possible to the laboratory for diagnosis
- Organization of awareness programme among the pig farmers and producers at regular intervals to make them aware about the alarming situation of the ASF, common signs and preventive measures of the disease.

- Keep a strict vigil on the entry of any live pigs and their product from the neighbouring states most particularly the states that share borders with Myanmar and China.
- Constructing a timeline is a useful way of representing the times during which infection and transmission of disease might have taken place, and therefore guiding an outbreak investigation. Timelines are used to determine time windows for introduction of the virus (based on the incubation period) and for spread to other premises (using the period of virus excretion).
- Once a timeline has been established, the next step is to use it for source and spread tracing in order to establish contacts that could have led to virus transmission during the calculated timeframe.

Advisory applicable to **Veterinary Department, Meghalaya**

- Improved technical capacity and expertise to identify and control ASF.
- Capacities to manage and inspect animal movement and trading of meat/meat products.
- Systems for rapid reporting of suspect cases.
- Well-prepared field investigation teams (RRTs)
- Appropriate enforcement of legislation for adequate biosecurity in pig production sectors and pig movement control.
- Proper outbreak containment, including humane culling of infected pigs and disposal of carcasses and their contaminated products.
- Cleaning and disinfection of affected farms and contaminated objects.
- Awareness programmes for all relevant stakeholders

SOP FOR STAMPING OUT POLICY FOR ASF (INCASE OF CONFIRMED POSITIVE CASES):

Zoning: Infected premises (IP) means an epidemiological entity where pigs have become infected. It may be a single farm or household or entire village and settlement. It may be a livestock market or abattoir.

A dangerous-contact premises is one for which there are epidemiological ground to suspect that it has become infected even though the disease is not yet clinically apparent. This might be through closed proximity or as a result of epidemiological tracing.

ZONING OF INFECTED AND HIGH RISK AREAS:

Sl. No.	Name of the Zone	Objectives	Action
1.	Infected Zone (IP)	Prevent further spread of infection.	- Culling of all pigs within 10 kms of positive confirmed cases (OIE). - Quarantine and ban of livestock movement, exit of live pigs, pig meat and other potentially contaminated materials. - Pig markets and abattoirs to be closed.
2.	Surveillance Zone	Enhanced active surveillance.	- Pigs should be inspected at weekly interval and owners to be questioned about disease occurrence, pig movement, etc. - Movement of pigs, pig meat, pig products from IP should be banned. - Movement from surveillance to free zone may be allowed

			but only after health inspection and issue of permit. - Abattoir and pig meat processing plant may be allowed to operate but must be subjected to strictly enforce zoo-sanitary codes of practices. - Sale of live pigs and pig meat may be allowed to continue unless they constitute a treat of further spread of the disease.
3.	Disease Free Zone	Preventing entry of the disease.	- Entry of pigs and pig products from infected zone should be banned. (Allowed only subjected to official permit from surveillance zone.)

DIFFERENTIAL DIAGNOSIS

Classical swine fever	Erysipelas
Salmonellosis	Septicemic pastuellosis
PRRS	Aujeszky's disease

POST-MORTEM FINDINGS:

Finally, ASF gets its classification as a viral hemorrhagic disease because of the lesions that form with the acute, subacute, and chronic cases. Lesions or hemorrhages occur throughout the body, such as on the lymph nodes, the kidneys, larynx, bladder, colon, and gall bladder.

LABORATORY SAMPLES:

Sl. No.	Type of Samples to be collected	Storage procedure
1.	Post mortem tissue samples (lymph nodes, spleen, tonsils, lungs, heart and kidney).	- Collected aseptically and kept chilled but not frozen.
2.	Whole (unclotted) blood.	- Collected aseptically into EDTA/Heparin from febrile pigs upto 5 days after onset of fever.
3.	Serum, spleen, lymph nodes, lungs and kidney (to detect antibodies).	-Collected in 10% Buffered formalin for histopathological examination and detection of virus by immuno-peroxidase test.

Note:

- Whole blood and unpreserved tissue samples to be transported on water-ice or frozen gel packs.
- Biological samples (blood, serum, tissues) of suspected animals should be sent to RDDL and as well as to NIHSAD, Bhopal for confirmatory diagnosis by SDDL, Shillong.

Controlling the disease is a shared interest and must be considered a shared responsibility. Veterinary services, which include public and private sectors in both affected and unaffected countries, have the mandate to safeguard animal health and welfare and should lead the implementation of effective coordinated countermeasures to minimize the economic loss due to the disease.

Note: There is no treatment and no vaccine available for ASF till date. The use of foreign manufactured hog cholera vaccine for CSF vaccination is strictly prohibited until further orders.
