GENERAL GUIDELINES ON
BLUETONGUE & P.P.R. DISEASE

Morbidity and mortality is presently reported in the sheep/goat population in some parts of the Maharashtra state. The symptoms observed in these animals are rise in temperature, lesions on dental pad, salivation, in few cases face is swollen, lameness, anorexia, in some cases there is enteritis. Some animals recover and few may succumb. The morbidity rate is high and mortality rate is low. Symptoms are suggestive of Blue tongue/PPR. It has been also found that the animals respond to the symptomatic treatment with broad-spectrum antibiotics. Due to similarity between the symptoms of the above mentioned diseases there are chances of misleading diagnosis. Hence some important features about these two diseases are highlighted below.

(1) BLUE TONGUE:

Oetiology: Bluetongue virus is an arbovirus (arthropod borne) that naturally infects domestic animals. Bluetongue virus is transmitted by several species of Culicoides (biting midges). Bluetongue is almost exclusively a disease of sheep. In goats clinical disease is rare, and, when present, is much milder than in sheep.

Transmission: The insect vectors of bluetongue virus breed in moist conditions in a variety of habitats, particularly damp, muddy areas and in faecal and plant matter. They have nocturnal feeding habits, preferring still, warm conditions, pastures and open pens.

Clinical Symptoms: If fever occurs, sheep are first pyrexia 4-10 days after infection. The morbidity rate in this disease varies from about 10 to 30% and the mortality rate is from about 1 to 5%. Other common clinical signs include oedema (of lips, nose, face, submandibulum, eyelids and sometimes ears), congestion (of mouth, nose, nasal cavity, conjunctiva, skin and coronary bands), lameness and depression. The oedema of lips and nose can give the sheep a ‘monkey-face’ appearance. There is frequently a serous nasal discharge,
later becoming mucopurulent. The congestion of the nose and nasal cavity produces a ‘sore muzzle’ effect. The mouth is sore and the sheep may champ to produce a frothy oral discharge. Sheep are not strictly anorexic, but eat less because of oral soreness and will hold food in their mouths to soften it before chewing. Affected sheep occasionally have swollen, congested, cyanotic tongues. Lameness, due to coronary band congestion, may occur early in the disease and lameness or torticollis, as a result of skeletal muscle damage, may occur later.

Many of these deaths are the result of pulmonary oedema and/or cardiac insufficiency. Further sheep may die from chronic disease 3 to 5 weeks after infection with bacterial complications, especially pasteurellosis. Under-nutrition arising from lameness and depression may be contributing factors.

Post Mortem Findings: In animals dying acutely, the oral mucosa is hyperaemic and petechiae or ecchymoses may be present. Excoriations may be in areas subject to mechanical abrasion; the edges of lips, dental pad, tongue and cheeks opposite the molar teeth. There
may be hyperaemia in the fore-stomachs. The lungs may be hyperaemic with severe alveolar and interstitial oedema, froth in the bronchi, and excess fluid in the thoracic cavity. The pericardial sac may have petechiae and excess fluid. A variable sized haemorrhage in the tunica media near the base of the pulmonary artery is almost pathognomonic. Subepicardial and subendothelial haemorrhages, particularly involving the left ventricle, are common. Generalized damage to the cardiovascular system is evidenced by widespread hyperaemia, oedema and haemorrhage.

**Collection of Material**: The following material may be collected and sent for diagnosis to this laboratory:

1. **From Ailing Animals**:
   a. Citrated blood at the height of thermal reaction on ice. In a flock of sheep showing mouth lesions the blood should preferably be collected from a sheep showing high temperature but no mouth lesions as yet, as this would be with the highest virus titre.
   b. Whole blood on ice.
   c. Paired sera samples first during acute stage of disease and the second 3 weeks later.

2. **From Dead Animals**:
   a. A piece of pulmonary artery showing hemorrhage, tip of heart and papillary muscle of heart in 10% Formalin. Pieces of visceral organs like liver, lung, kidney, spleen, lymphnode, heart, pieces of intestines showing hemorrhages or lesions, pieces of tongue showing hemorrhages or lesions, piece of tongue showing hemorrhages or lesions, piece of necrosed muscle in 10% Formalin for histopathological examination.
   b. Mesenteric Lymph Node and spleen on Ice for virus isolation.
Differential Diagnosis:

It should be differentiated from Stomatitis, FMD, Contagious ecthyma & PPR.

2) PESTE DES PETITS RUMINANTS:

Oetiology & Transmission: Peste des petits ruminants (PPR) is an acute or subacute viral disease of goats and sheep characterized by fever, erosive stomatitis, conjunctivitis, gastroenteritis, and pneumonia. Goats are usually more severely affected than sheep.

Peste des petits ruminants is caused by a paramyxovirus of the *Morbillivirus* genus. Peste des petits ruminants is primarily a disease of goats and sheep. Peste des petits ruminants is not very contagious and transmission requires close contact. Ocular, nasal, and oral secretions and feces are the sources of virus. Contact infection occurs mainly through inhalation of aerosols produced by sneezing and coughing. Fomites such as bedding may also contribute to the onset of an outbreak. Infected animals may transmit the disease during the incubation period.

Young animals (4 to 8 months) have more severe disease, and morbidity and mortality are higher. PPR is less severe in sheep than in goats. Poor nutritional status, stress of movement, and concurrent parasitic and bacterial infections enhance the severity of clinical signs.

Clinical Symptoms: Peste des petits ruminants has an incubation period of 4 to 5 days. The disease usually appears in the acute form, with an incubation period of 4 to 5 days followed by a sudden rise in body temperature to 104-106°F (40-41°C). The temperature usually remains high for about 5 to 8 days before slowly returning to normal preceding recovery or dropping below normal before death. Affected animals appear ill and restless and have a dull coat, dry muzzle, and depressed appetite. Accompanying these nonspecific signs are a series of changes that make up a highly characteristic syndrome. From the
onset of fever, most animals have a serous nasal discharge, which progressively becomes mucopurulent. The discharge may remain slight or may progress, resulting in a profuse catarrhal exudate, which crusts over and occludes the nostrils. At this stage, animals have respiratory distress, and there is much sneezing in an attempt to clear the nose. Small areas of necrosis may be seen on the visible nasal mucous membranes. The conjunctiva usually becomes congested, and the medial canthus may have some crusting. As with the nose, there may be profuse catarrhal conjunctivitis resulting in matting of the eyelids.

Necrotic stomatitis is common. It starts as small, roughened, red, superficial necrotic foci on the gum below the incisor teeth. These areas may resolve within 48 hours or progressively increase to involve the dental pad, the hard palate, cheeks and their papillae, and the dorsum of the anterior part of the tongue. Necrosis may result in shallow irregular nonhemorrhagic erosions in the affected areas of the mouth and deep fissures on the tongue. Necrotic debris may collect at the oral commissures, and scabs may form along the mucocutaneous junction of the lips. There may be excessive salivation but not to the extent of drooling.

At the height of development of oral lesions, most animals manifest severe diarrhea, often profuse but not hemorrhagic. As it progresses,
there is severe dehydration, emaciation, and dyspnea followed by hypothermia, and death usually occurs after a course of 5 to 10 days. Bronchopneumonia, evidenced by coughing, is a common feature in the later stages of PPR. Pregnant animals may abort.

Secondary latent infections may be activated and complicate the clinical picture.

**Post Mortem Findings**: The pathology caused by PPR is dominated by inflammatory and necrotic lesions in the mouth and the gastrointestinal tract. The rumen, reticulum, and omasum rarely have lesions. Sometimes, there may be erosions on the pillars of the rumen. The abomasum is a common site of regularly outlined erosions and often oozes blood.

Lesions in the small intestine are generally moderate, being limited to small streaks of hemorrhages and, sometimes, erosions in the first portion of the duodenum and the terminal ileum. Peyer’s patches are the site of extensive necrosis, which may result in severe ulceration. The large intestine is usually more severely affected with congestion around the ileocecal valve, at the ceco-colic junction, and in the rectum. In the posterior part of the colon and the rectum, discontinuous streaks of congestion ("zebra stripes") form on the crests of the mucosal folds.

In the respiratory system, small erosions and petechiae may be visible on the nasal mucosa, turbinates, larynx and trachea. Bronchopneumonia may be present, usually confined to the anteroventral areas and is characterized by consolidation and atelectasis. There may be pleuritis, which may become exudative and results in hydrothorax.

The spleen may be slightly enlarged and congested. Most lymph nodes throughout the body are enlarged, congested and edematous.
**Specimens to be sent for Laboratory:**

<table>
<thead>
<tr>
<th>Type of Animal</th>
<th>Material &amp; Quantity</th>
<th>Preservatives to be used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ailing Animals</td>
<td>Blood – 5 ml at height of Temperature.</td>
<td>1.5% EDTA in 0.7 % N.S.S. (1.5gms of EDTA+100ml of Dist. water 700mg of Nacl)</td>
</tr>
<tr>
<td></td>
<td>Clotted Blood</td>
<td>Heparin is a second alternative. In absence of preservative defibrinated blood should be collected. It should be on ice, not frozen. (if possible, paired sera), On Ice. (Not frozen) within 12 hours after collection</td>
</tr>
<tr>
<td></td>
<td>Swabs of serous nasal and lachrymal discharges</td>
<td>On Ice. (Not frozen) within 12 hours after collection</td>
</tr>
<tr>
<td></td>
<td>Blood – 5 ml pathology</td>
<td>In citrated vial for clinical</td>
</tr>
<tr>
<td></td>
<td>Serum – 5 ml</td>
<td>without preservative on ice. (Paired Sera)</td>
</tr>
<tr>
<td></td>
<td>Lymph node – 2ml</td>
<td>should contain tissue debris &amp; should be on ice.</td>
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<tr>
<td></td>
<td>Blood smears – 4 to 5 in No.</td>
<td>Properly dried, fixed &amp; marked for DLC.</td>
</tr>
<tr>
<td>Dead Animals</td>
<td>Tissues of all Vital organs like Lung, Liver,</td>
<td>On ice preferably.</td>
</tr>
<tr>
<td></td>
<td>Spleen, Mesentric Lymph node, Pancreas,</td>
<td>In Glycerine saline – second alternative. Send samples by Messenger on same Day to Lab.</td>
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<tr>
<td></td>
<td>tonsils, sections of ileum &amp; large Intestine.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tissues of Vital organs</td>
<td>In 10 % formalene (1:1 ratio) for histopathology.</td>
</tr>
<tr>
<td>Recovered animals</td>
<td>Serum – 5 ml</td>
<td>without any preservative, on ice.</td>
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</tbody>
</table>
**Differential Diagnosis:**

It should be differentiated from Stomatitis, FMD, Contagious ecthyma & Blue Tongue.

**Preventive & Control measures:**

Prophylactic vaccination against blue tongue is not available. However, in case of PPR if the disease have been diagnosed on P.M. / laboratory confirmation the prophylactic vaccination may be carried out in the healthy animals. Also following measures which can be made available even at village level, should be suggested to flock owners.

a. The affected flock should be shifted to a higher level, wherever possible.
b. Since the bluetongue is transmitted through mosquitoes and culicoides spp. Anti mosquito measures such as spraying of insecticides in sheds or smoking of sheds may be undertaken.
c. Water logging around the sheep flocks should be avoided.
d. Movement of sheep flock should be restricted.
e. Lime powder should be sprinkled in the shade.
f. Antistress medicines consisting of Vit. C / mineral mixtures should be given through water/ feed.
g. Mouth / foot Lesions should be washed thoroughly with 4% solution of potassium permanganate or 2–4 % solution of sada bi carb. And then apply boroglycerine over the mouth lesions. Otherwise turmeric powder with oil can also be applied.
h. Due to lesions in mouth animals are off feed. Hence feed such animals with palatable green fodder.ex. Lucern, green grass etc. It is advisable not to let loose the animals for grazing under the bright sun light.
i. In order to avoid secondary bacterial infection in ailing animals, broad-spectrum antibiotics along with liver tonics should be given.
j. In order to avoid secondary bacterial infection due to pasteurellosis, preventive vaccination may also be carried out.
k. Strict biosecurity measures should also be followed.
Guidelines for Maintaining Livestock Health After a Flood Disease Control And Sanitation

If fields or farm buildings have been flooded, take special precautions against flood-related accidents or diseases in poultry and livestock. Give animals extra care, particularly if they have been stranded by floodwater, and have been off regular feeding schedules. Keep fields clear of harmful debris, and clean buildings as soon as possible. In addition, watch for signs of flood-related diseases, such as lameness, fever, difficulty in breathing, muscle contractions or swelling of shoulder, chest, back, neck or throat. Animal population is at risk. A number of safety precautions, are given below.

1. DISEASE CONTROL

Following a flood there may be danger of infectious diseases in livestock, but unless serious outbreaks of infection have occurred recently, the situation should not be alarming. Observe these precautions:

- Where large numbers of animals are assembled, watch for any indication of infectious diseases such as pneumonia, foot rot or leptospirosis. These diseases are more likely to occur where cattle are crowded on wet ground and where horn flies and houseflies are abundant.

- Promptly report any sign of disease to a local veterinarian. Contact a veterinarian about vaccinating animals for immunity from flood-related diseases such as Hemorrhagic Septicemia and blackleg.

2. FEED AND WATER

- Provide clean, uncontaminated water.

- Inspect feeds such as corn, wheat and hay. Do not feed flood-damaged or moldy hay unless it has been tested for mycotoxins, toxic substances produced by fungi.
• Do not use any feed or forage that may have been contaminated by chemicals or pesticides.

3. PASTURE LAND

Standing water may have ruined some pastures. Lack of adequate forage could

• force animals to eat poisonous plants. So avoid grazing of animals in the unknown pasture land.

• Before restocking flooded pastures, remove debris, especially along fence lines and in corners. Livestock could be injured from pieces of barbed wire, sharp metal and trash.

4. PROTECTING DAIRY COWS

• Try to milk at regular times. It is better to lose the milk from one milking than to stress high producing cows.

• If feed supplies are limited, give the largest portion of available feed to the highest producing cows and those recently fresh.

• Clean and sanitize milking parlor and equipment before returning to normal use.

• Watch for signs of mastitis, which is likely to flare up if milking methods, time and equipment have been changed.

5. SANITATION

• Clean and Spray the buildings with a good disinfectant before animals occupy them again.

• Remove debris from cattle sheds. Scrub and disinfect walls, ceilings, floors and other equipment.

• Scrub the milk house and equipment with detergent and hot water. Sanitize equipment, walls, ceilings and floors with dairy sanitizer equipment.

• Dispose of animal carcasses promptly. Burn or bury carcasses deeply in a place approved by your local authority.
6. **INSECTS**

Mosquitoes and other pests may be abundant after a flood. They not only annoy animals, but some species carry disease. Spray animals with an insect repellent.

7. **MANAGEMENT OF LIVESTOCK**

- Be absolutely certain that herbicides, pesticides and treated seeds are not even remotely accessible to livestock, and are stored where floodwater will not contaminate livestock feed or water.
- Turn off electricity at the main switch. Livestock could damage electric fixtures, causing fires or electrocutions.
- The animals are under stress due to heavy rains / insufficient fodder during rains, hence it is advised to add minerals and vitamins in feed.
- Unconfined livestock can usually take care of themselves during floods. Do not let them become trapped in low-lying pens.

8. **MANAGEMENT OF POULTRY**

Because of heavy rains, birds and litter may become wet. Birds can easily get infection of Respiratory and Digestive system. Heavy mortality on account of Coccidiosis is possible. Proper medication with anti-stress drugs and vitamins so also keeping litter dry can control the mortality in Poultry.