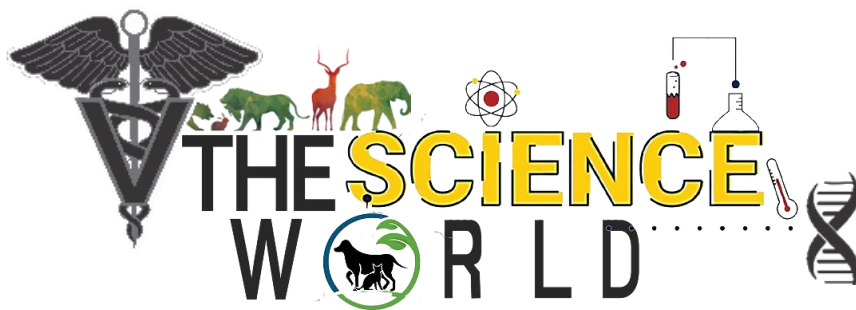




A Monthly e Magazine
ISSN:2583-2212

Popular Article

Sept, 2026 Vol.6(9), 2772-2776

Peste des Petits Ruminants in Sheep

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doi.org/10.5281/ScienceWorld.22998804

Introduction

Peste des petits ruminants, commonly known as **PPR or sheep and goat plague**, is one of the most important viral diseases affecting small ruminants. The disease is highly contagious and can spread rapidly through sheep and goat populations, causing severe illness, high mortality and substantial economic losses. Although goats are often severely affected, sheep are also highly susceptible and can develop serious disease, particularly when a susceptible flock is exposed to the virus for the first time. PPR is much more than an animal disease. For millions of smallholder farmers, sheep and goats represent savings, food, income and financial security. Losses caused by PPR can therefore directly affect household livelihoods and food security. WOA and FAO estimate that more than **330 million people** worldwide depend on small ruminants, while annual economic losses associated with PPR can reach approximately **USD 2.1 billion**. The good news is that PPR is considered an excellent candidate for global eradication. An effective vaccine is available, the virus has a relatively short infectious period, there is no recognized carrier state and there is no established long-term reservoir outside susceptible animal populations. FAO and WOA have therefore set **2030 as the target for global eradication of PPR**.

Etiology

PPR is caused by **Peste des petits ruminants virus (PPRV)**, a member of the genus *Morbillivirus* within the family *Paramyxoviridae*. It is an enveloped, negative-sense, single-stranded RNA virus and is closely related to other important morbilliviruses, particularly rinderpest virus, measles virus and canine distemper virus. Unlike bluetongue virus, which has



numerous serotypes, PPRV is currently considered to have **a single serotype**, although the virus is divided into several genetic lineages. Four major genetic lineages, designated I, II, III and IV, have been described. Lineage IV has become particularly important because of its wide geographical distribution across Asia, the Middle East and parts of Africa. The existence of a single serotype is an important advantage for eradication because an effective vaccine can provide broad protection against circulating PPR viruses. WOAHP notes that high-quality PPR vaccines are available and can provide long-lasting, potentially lifelong protection following vaccination.

Transmission

PPR is primarily transmitted through **close contact between infected and susceptible animals**. The virus is present in secretions and excretions of infected animals, particularly nasal, ocular and oral secretions. Coughing, sneezing and close contact can generate infectious droplets that allow the virus to move rapidly through a flock. The risk of transmission increases when animals are kept in crowded conditions or when sheep and goats from different farms or villages are mixed. Livestock markets, communal grazing areas, animal fairs and long-distance transportation can therefore become important opportunities for disease spread. Infected animals may begin shedding virus before the most obvious clinical signs appear. This creates a dangerous situation because apparently healthy animals may be moved or sold while infection is already developing within the flock.

Unlike diseases transmitted by biting insects, PPR does not require a vector. The disease spreads primarily through direct contact and contaminated secretions. However, contaminated equipment, clothing, vehicles and other materials may contribute to mechanical spread, particularly where biosecurity is poor. Animal movement is one of the most important drivers of transboundary spread. Recent PPR outbreaks in previously free European countries have reinforced the importance of controlling animal movements and strengthening surveillance along livestock trade routes.

Pathogenesis

Following exposure, PPRV enters the animal mainly through the respiratory route and replicates initially in lymphoid tissues and cells of the immune system. The virus has a strong affinity for lymphoid and epithelial tissues. One of the earliest major events is **lymphoid depletion**, which can produce marked immunosuppression. As the infection progresses, the virus spreads through the bloodstream and reaches epithelial surfaces, particularly those lining the respiratory, digestive and ocular systems. This combination of immune-system damage and epithelial injury explains the characteristic clinical picture of PPR. Damage to the oral mucosa



produces painful erosions and ulcers, while involvement of the respiratory tract leads to nasal discharge, coughing and pneumonia. Infection of the intestinal epithelium contributes to severe diarrhoea. The resulting dehydration, respiratory distress, tissue damage and secondary bacterial infections can rapidly weaken affected animals. In severe outbreaks, particularly in naïve flocks, mortality can be extremely high. Young animals are often more severely affected than adults, particularly when they have inadequate maternal protection or have never been exposed to the virus or vaccinated.

Clinical Signs

The clinical presentation of PPR can vary depending on the virus strain, age, breed, immune status and previous exposure of the flock. However, the combination of **fever, ocular and nasal discharge, oral lesions, pneumonia and diarrhoea** should immediately raise suspicion of PPR. The disease often begins with a sudden rise in body temperature. Affected sheep become depressed, weak and reluctant to move. Appetite decreases and animals may separate themselves from the rest of the flock.

One of the early and noticeable signs is **watery discharge from the eyes and nose**. The discharge may initially be clear but can become thick and mucopurulent as the disease progresses. The eyelids may become inflamed and crusts may accumulate around the eyes and nostrils. The mouth is one of the most characteristic sites of infection. Small areas of congestion may progress to erosions and ulcers involving the gums, lips, tongue, dental pad and other oral mucosa. These lesions are painful and affected animals may have difficulty eating. Excessive salivation and an unpleasant smell from the mouth may also be noticed. As the respiratory tract becomes involved, animals may develop coughing, rapid breathing, difficulty breathing and nasal discharge. Severe pneumonia can develop, particularly when secondary bacterial infections occur. Another major feature is **profuse diarrhoea**. Initially, the faeces may become soft, but severe watery diarrhoea can develop later. This results in rapid dehydration, weakness and loss of body condition. Pregnant animals may experience reproductive losses, while severely affected young animals may die within a short period following the development of severe systemic disease.

Diagnosis

Early laboratory diagnosis is essential because PPR is a highly contagious and notifiable transboundary disease. Samples such as nasal, oral or ocular swabs, whole blood and appropriate tissue specimens can be collected according to veterinary diagnostic protocols. **Real-time reverse transcription polymerase chain reaction (RT-qPCR)** is an important diagnostic method for detecting PPRV RNA and can provide rapid confirmation. Virus



detection and molecular characterization can also help identify the circulating genetic lineage. Serological tests can be used to detect antibodies and are particularly valuable for monitoring vaccination programmes and determining previous exposure at the population level. Because PPR can resemble several other diseases, laboratory confirmation is particularly important when the disease is suspected in an area that has been free of PPR or when an unusual outbreak pattern occurs. The availability of reliable diagnostic assays is one of the advantages that makes PPR a realistic target for global eradication. WOAHP emphasizes the availability of effective diagnostic tools alongside vaccination as a major strength of the global eradication programme.

Treatment

There is currently **no specific antiviral treatment that eliminates PPR virus from infected sheep**. Management is therefore mainly supportive and should be carried out under veterinary supervision. Affected animals should be provided with clean drinking water, easily accessible nutritious feed and comfortable housing. Because oral lesions can make eating painful, soft and palatable feed may help maintain nutritional intake. Animals suffering from severe diarrhoea require careful attention to hydration and electrolyte balance. Secondary bacterial infections may occur because PPR produces significant immunosuppression. Appropriate antimicrobial therapy may therefore be considered by a veterinarian when secondary bacterial infection is suspected. Antibiotics, however, do not act against the PPR virus itself and should not be used as a substitute for vaccination or outbreak control.

Control and Prevention

Prevention is the most powerful weapon against PPR. The central strategy is **vaccination combined with surveillance, early detection, movement control and strong veterinary services**. PPR vaccines are highly effective. A single properly administered dose of an appropriate high-quality vaccine can provide long-lasting protection, and WOAHP and FAO identify vaccination as a key intervention during the control and eradication stages of the global strategy. High vaccination coverage is particularly important because the objective is not simply to protect individual sheep but to reduce the number of susceptible animals within the population. When a large proportion of the flock is immune, opportunities for the virus to spread are greatly reduced.

However, vaccination programmes need to be carefully planned. Vaccine quality, cold-chain maintenance, correct administration, appropriate timing and adequate coverage all influence the success of a campaign. Recent field experience demonstrates the value of large-scale vaccination combined with monitoring. In Eritrea, a campaign supported by FAO during 2025



vaccinated approximately **2.8 million sheep and goats**, with post-vaccination sero-monitoring used to evaluate immune response.

Conclusion

Peste des petits ruminants is a highly contagious viral disease that can move rapidly through susceptible sheep and goat populations and cause devastating mortality and economic losses. Fever, ocular and nasal discharge, painful oral erosions, pneumonia and severe diarrhoea are the classic clinical features that should alert farmers and veterinarians to the possibility of PPR. Recent outbreaks in new geographical areas demonstrate that PPR remains a global threat and that complacency can quickly reverse progress. At the same time, recent international vaccination campaigns and strengthened monitoring systems show that substantial progress toward eradication is possible. FAO and WOAHA continue to work toward the ambitious goal of eliminating PPR worldwide by **2030**. For the farmer, the message is simple: **vaccinate regularly, avoid unnecessary animal movement, isolate sick animals and report suspicious disease early**. For veterinarians, early recognition, laboratory confirmation and surveillance are critical. For policymakers, sustained investment in vaccination and veterinary services is essential. PPR may be known as “sheep and goat plague,” but it does not have to remain a permanent threat. With an effective vaccine, reliable diagnostic tools and coordinated veterinary action, **a PPR-free future is an achievable goal**.

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