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# ***Contagious Caprine Pleuropneumonia (CCPP) in Goats - An Introduction***

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## **ABSTRACT**

**Contagious Caprine Pleuropneumonia (CCPP) is a highly contagious and economically important respiratory disease affecting goats worldwide. The disease is caused by *Mycoplasma capricolum* subsp. *capripneumoniae*, a pathogenic organism that primarily infects the lungs and pleural membranes, resulting in severe pneumonia and pleuropneumonia. Transmission occurs mainly through close contact between infected and healthy animals via respiratory secretions, particularly under conditions of overcrowding and poor ventilation. Clinically, affected goats exhibit high fever, respiratory distress, coughing, nasal discharge, and progressive weakness, which may lead to high mortality during outbreaks. Diagnosis of the disease is based on clinical observations, postmortem findings such as lung consolidation and pleural fluid accumulation, and laboratory confirmation using culture, serological methods, or molecular techniques like polymerase chain reaction (PCR). Effective prevention and control rely on improved herd management practices, strict biosecurity measures, early detection of infected animals, and vaccination in endemic regions. Due to its rapid spread and significant economic impact on goat farming systems, especially in developing**

**countries, timely diagnosis and implementation of preventive strategies are essential for minimizing losses and ensuring sustainable goat production.**

## **INTRODUCTION**

Contagious Caprine Pleuropneumonia (CCPP) is one of the most severe and economically significant respiratory diseases affecting goats worldwide. It is a WOAH (OIE) listed notifiable disease of goats due to its high morbidity, mortality, and economic significance. The disease is characterized by acute inflammation of the lungs and pleura, leading to severe respiratory distress and high mortality in affected herds. CCPP is particularly important in regions where goat farming serves as a major source of livelihood, nutrition, and income for rural communities. Because of its rapid spread and devastating impact on goat populations, the disease has gained considerable attention from veterinarians, researchers, and livestock producers. The primary causative agent of CCPP is *Mycoplasma capricolum* subsp. *Capripneumoniae* (often abbreviated as *Mccp*), a highly pathogenic bacterium belonging to the class *Mollicutes*. The F38 biotype was an early classification of *Mccp*, named after one of the first isolates identified during goat disease outbreaks. Unlike many other bacteria, mycoplasmas lack a cell wall, which contributes to their unique biological characteristics and resistance to certain antibiotics. Mycoplasma, also known as PPLO (Pleuropneumonia-like organisms), are the smallest free-living organisms. The organism specifically targets the respiratory system of goats, causing severe pneumonia and inflammation of the pleural membranes. Transmission of the pathogen mainly occurs through close contact between infected and healthy animals via respiratory droplets, particularly in crowded or poorly ventilated housing conditions. Outbreaks of CCPP can lead to serious economic losses due to high morbidity and mortality, reduced productivity, treatment expenses, and trade restrictions. In many cases, mortality rates may reach alarming levels if the disease is not detected and managed promptly. The highly contagious nature of the infection allows it to spread rapidly within herds, making it a major concern for goat farmers and animal health authorities. Therefore, understanding clinical manifestations, diagnostic methods, and preventive strategies of CCPP is essential for effective disease management and control in goat populations.

## **CLINICAL SIGNS AND SYMPTOMS**

CCPP is characterized by severe respiratory manifestations that vary depending on the stage and severity of infection. It shows very high morbidity, approaching 100%, and mortality ranging from 80–100%. The disease usually begins with a sudden onset of high fever, often reaching temperatures of 41–42 °C, accompanied by dullness, depression, and loss of appetite. Affected goats typically appear weak and reluctant to move, often isolating themselves from the rest of the herd. As the infection progresses, respiratory distress becomes the most prominent clinical feature. One of the characteristic signs of CCPP is labored and painful breathing. Infected animals show rapid and shallow respiration, frequently accompanied by coughing and nasal discharge that may initially be serous but later become mucopurulent. Due to severe inflammation of the lungs and pleura, goats often extend their necks and stand with their elbows abducted in an attempt to ease breathing. In many cases, affected animals may produce grunting sounds while breathing, reflecting intense pleural pain and respiratory difficulty. As the disease advances, the respiratory symptoms become more pronounced, and animals may exhibit frothy nasal discharge, severe dyspnea, and marked weakness. In acute cases, mortality can occur within a few days of the onset of symptoms, particularly in naive or highly susceptible herds.

Postmortem examination of affected animals typically reveals extensive lung consolidation and accumulation of pleural fluid, which are hallmark features of the disease. The severity and rapid progression of these clinical signs make early recognition of CCPP crucial for timely intervention and control of outbreaks.

## **DIAGNOSIS**

The diagnosis of the disease is based on a combination of clinical observation, epidemiological information, and laboratory confirmation. In suspected outbreaks, the presence of characteristic respiratory signs such as high fever, severe dyspnea, coughing, and nasal discharge in multiple animals within a herd raises strong suspicion of the disease. In addition, the rapid spread of illness among goats and the high mortality rate observed during outbreaks further support the presumptive diagnosis of CCPP. Postmortem examination of affected animals provides important diagnostic clues. The most typical lesions include severe unilateral or bilateral pneumonia, consolidation of lung tissue, and accumulation of straw-colored pleural fluid within the thoracic cavity. Thick fibrin deposits on the pleural surfaces and adhesions between the lungs and chest wall are also frequently observed. These pathological findings are considered characteristic of the disease and are often used to support field diagnosis. For definitive confirmation, laboratory tests are essential to detect the causative organism, *Mccp*. Isolation of the pathogen from lung tissue, pleural fluid, or nasal swabs can be attempted using specialized culture media designed for mycoplasma organisms. However, culture methods are often slow and technically demanding. Therefore, molecular techniques such as polymerase chain reaction (PCR) are widely used for rapid and accurate detection of the pathogen. Serological tests may also be employed to detect antibodies against the organism and to support diagnosis during surveillance and epidemiological studies. Together, these diagnostic approaches help ensure accurate identification and effective management of CCPP in goat populations.

## **PREVENTION AND CONTROL**

The prevention and control of CCPP primarily rely on effective herd management practices, strict biosecurity measures, and timely vaccination in endemic areas. Since the disease spreads mainly through close contact between infected and healthy animals via respiratory secretions, controlling animal movement and avoiding overcrowding are essential steps in reducing transmission. Newly purchased or introduced animals should be properly quarantined and observed for any signs of respiratory illness before being mixed with the existing herd. Maintaining good housing conditions also plays an important role in disease prevention. Proper ventilation, clean and dry shelters, and adequate spacing between animals help reduce stress and minimize the accumulation of infectious agents in the environment. In addition, good nutrition and overall herd health management improve the immune status of animals, making them less susceptible to infection. Early detection of suspected cases and immediate isolation of affected animals are crucial to limit the spread of the disease within the herd. Vaccination is considered one of the most effective strategies for controlling CCPP in regions where the disease is endemic. Regular vaccination programs can significantly reduce the incidence and severity of outbreaks. In the event of confirmed cases, prompt treatment with appropriate antibiotics may help reduce mortality and control the progression of the disease, although treatment alone may not completely eliminate the infection from a herd. Therefore, a comprehensive approach combining vaccination, biosecurity, proper management, and early

intervention is essential for the effective prevention and control of CCPP in goats. In India, there is no commercial vaccine available.

## CONCLUSION

Contagious Caprine Pleuropneumonia (CCPP) is a highly contagious and serious respiratory disease that poses a major threat to goat health and productivity. The disease is primarily caused by *Mycoplasma capricolum* subsp. *capripneumoniae* and is characterized by severe pneumonia, respiratory distress, and high mortality in affected herds. Due to its rapid transmission and devastating impact, CCPP continues to be a significant concern for goat farmers, particularly in regions where small ruminant farming plays an important role in rural livelihoods. Early recognition of clinical signs, accurate diagnosis, and timely intervention are essential for limiting the spread of the disease and reducing economic losses. In addition, implementing proper management practices, maintaining good hygiene, and following effective vaccination programs are key strategies for controlling outbreaks. Strengthening awareness among farmers and improving veterinary surveillance can further contribute to better prevention and management of the disease. Overall, an integrated approach involving good husbandry practices, disease monitoring, and preventive measures is essential for reducing the impact of CCPP and ensuring sustainable goat production.

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