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Macroscopic lesions caused by Peste des Petits Ruminants in sheep from the collection centers of Tulcea county

Mircea Lazăr, Ioana Buzdugan, Silviu Muscalu, Roxana Lazăr
University of Life Sciences Ion Ionescu de la Brad, Faculty of Veterinary Medicine,
700489, M. Sadoveanu Alley 8, Iasi, Romania
DSVSA Tulcea, Romania
Correspondence: roxana.lazar@iuls.com

Abstract: Peste des petits ruminants (PPR) is a highly contagious viral disease that severely impacts sheep and goats, leading to significant morbidity and mortality. This study focuses on the macroscopic lesions (oral, lung, gastrointestinal) identified in sheep from collection centers in *Tulcea County*, an area at high risk for PPR transmission. The aforementioned lesions were documented in animals suspected of PPR infection and linked to the disease's characteristic clinical signs. The insights gained from these observations are critical for early differential and then presumptive diagnosis, these steps being crucial for guiding effective control strategies to limit the spread of the virus. This case report highlights the importance of necropsy-based diagnosis in early detection and outbreak control of PPR in endemic risk areas.
Keywords: *Peste des petits ruminants, sheep, macroscopic lesions, Tulcea*

Introduction

Peste des petits ruminants (PPR) is a severe and highly contagious viral disease affecting small ruminants, caused by a *Morbillivirus* from the *Paramyxoviridae family*, closely related to the rinderpest virus. First described in Côte d'Ivoire in 1942, the disease has since spread across Africa, the Middle East, Asia, and parts of Europe. Within the European Union, the first confirmed outbreak occurred in Bulgaria in 2018, limited to nine epizootic events affecting sheep. Conversely, Turkey has been endemic for PPR since 1992, with outbreaks recorded nearly every year. The disease has significant economic consequences, including production losses, trade restrictions, and high control costs. In Romania, the first confirmed case emerged in *July 2024 in Tulcea* County, following molecular diagnostics by the Institute for Diagnosis and Animal Health (IDAH). To date, *67 outbreaks* have been reported, primarily in the southeast (*Tulcea, Constanța, Ialomița*) and, to a lesser extent, in Timiș. This study aims to document the macroscopic lesions associated with PPR in infected sheep from Tulcea, supporting improved understanding and disease control efforts.

Materials and Methods

PPR is clinically expressed through respiratory and digestive signs such as fever, nasal discharge, oral erosions, bronchopneumonia, and diarrhea—none of which are specific to the disease. Clinical forms vary (peracute, acute, subacute, subclinical), often coexisting within the same herd. Diagnosis is challenging due to overlapping symptoms with other endemic diseases and possible secondary infections. To confirm suspicion, 25 sheep were selected for necropsy. Lesions in the respiratory, digestive, and lymphoid systems were documented, and tissue samples were collected for histopathological and virological analysis, following ethical protocols.

Results

In Tulcea county, the post-mortem examinations of sheep in the collection centers revealed the following macroscopic aspects:

❖ *Lesions of the oral and nasal mucosa:*

Sheep infected with the PPR virus frequently show erosions and ulcerations (Figure 1) on the oral mucosa, gums, tongue and soft palate. These lesions can progress to necrosis, being accompanied by hypersalivation. At the level of the nasal cavity, an initial serous discharge is observed, which evolves into mucopurulent secretions, forming thick crusts in the nostrils (Figure 2).

Figure 1. Oral erosions and ulcerations (sheep)

Figure 2. Crusts around the nasal area (sheep)

❖ *Pulmonary lesions:*

The lungs often show signs of consolidation and edema, with the appearance of hemorrhagic foci and hepatization (Figure 3), especially in the anterior lobes. Bronchopneumonia (Figure 3) is a common complication, favored by secondary bacterial infections caused by PPR virus-induced immunosuppression.

Figure 3. Lungs – Bronchopneumonia and hemorrhagic focci and hepatization

❖ *Gastrointestinal lesions:*

During the necropsy, severe inflammation of the intestinal mucosa was observed, with the appearance of erosions and ulcerations along the entire length of the digestive tract. The lesions are particularly marked in the small intestine and colon, where characteristic linear hemorrhagic streaks, known as "zebra stripes," may appear. These lesions are associated with severe, sometimes hemorrhagic diarrhea (Figure 4).

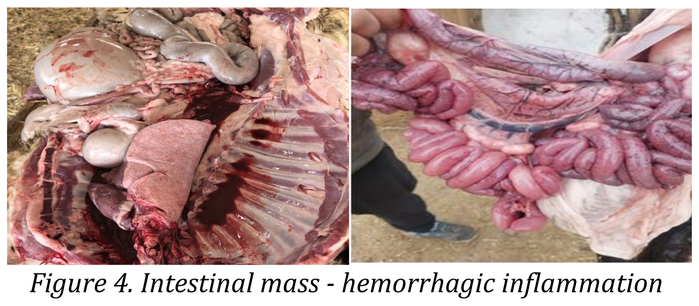

Figure 4. Intestinal mass - hemorrhagic inflammation

❖ *Skin lesions:*

In protracted cases, skin lesions in the form of exudative dermatitis have been observed, especially in the perineal areas and on the limbs. These lesions are often exacerbated by secondary bacterial infections.

❖ *Lymphoid lesions:*

The lymph nodes, especially the mesenteric and bronchial ones, are frequently enlarged, edematous and show focal necrosis. The spleen may show necrotic lesions and is often enlarged.

❖ *Liver Lesions:*

The liver may show severe congestive lesions, in some cases, focal necrosis and congested adjacent lymph nodes (Figure 5).

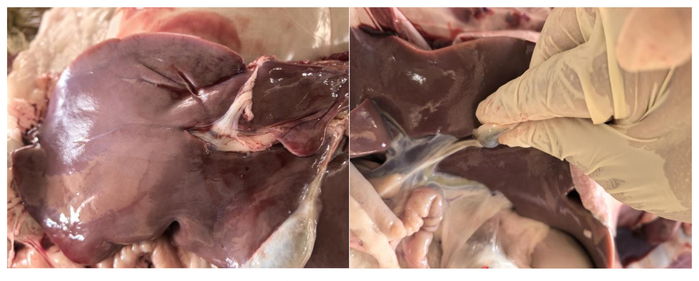

Figure 5. Liver - congestion

Conclusions

The study conducted in Tulcea County sheds light on the significance of macroscopic lesions in the clinical and pathological diagnosis of peste des petits ruminants (PPR) in sheep. The oral, gastrointestinal, and respiratory lesions observed during field necropsies are consistent with the classical presentation of acute PPR described in the literature and outlined in the Romanian Operational Manual for PPR control (ANSVSA, 2018).

The presence of characteristic lesions, such as necrotic erosions in the buccal cavity, pulmonary consolidation, intestinal hemorrhages with zebra stripe patterns, and mesenteric lymphadenopathy, supports the use of gross pathology as a reliable diagnostic tool in outbreaks. The findings emphasize the importance of early necropsy procedures in collection centers, especially in high-risk border areas, where transboundary animal movement increases the risk of introduction and spread of the disease.

To enhance preparedness and response capabilities, the following sustainable recommendations are proposed:

- ❖ systematic training of veterinary personnel and farmers on the early recognition of PPR lesions and reporting protocols.
- ❖ implementation of routine surveillance at collection centers using macroscopic lesion checklists, in alignment with ANSVSA protocols.
- ❖ strategic investment in equipping field units with mobile necropsy and sampling kits to ensure timely and safe post-mortem examination.
- ❖ strengthening biosecurity measures and maintaining up-to-date epidemiological records, particularly in zones near international borders.
- ❖ promotion of cross-border cooperation in monitoring and vaccination programs, given the contagious nature and high transboundary potential of PPR.