Viral diseases in sheep and goats

Today we will learn about the most important viral diseases of sheep and goats, which are usually grouped together as small ruminants.

In general, there are less viral diseases known in sheep and goats than in cows. This does not mean that there are fewer viruses that affect them, but they are less studied.

Sheep and goats share many diseases caused by the same virus, although sometimes with different clinical signs. As in cattle, many of these viruses can affect wild ruminants, as mouflon, deer etc., which complicates their control.

Viruses can affect all the organs and tissues in sheep and goats, but the most important are those that affect:

- The respiratory tract, such as retrovirus and paramyxovirus,
- The digestive system, such as rotavirus, especially in very young animals,
- The central nervous system, such as Retroviruses and prions.
- The viruses that cause ulcers and wounds in the mucosa of the muzzle and mouth and on hooves, such as peste des petits ruminants virus, or the blue tongue or FMD viruses. Lesions caused in the skin by poxvirus, such as sheep and goat pox virus, are also important.
- And finally, viruses that can cause abortions and reproductive disorders in pregnant females, such as bunyaviruses and flaviviruses.

As in the case of cattle, the appearance and severity of the disease often depends on the age and the immune status of the animals infected. We'll see as examples, three viral diseases shared by small ruminants, all notifiable to the OIE.

Bluetongue is caused by an Orbivirus, which belongs to the family Reoviridae (naked RNA viruses) and has high antigenic diversity. The disease appears mainly in sheep and to a lesser extent in cows.

The virus is transmitted by Culicoides insects, that when they bite sheep and cows they swallow viruses along with blood, which they inoculate onto other animals that they bite. Therefore, this disease appears only in locations with climatic conditions that allow the presence of Culicoides. Bluetongue has been spreading gradually, and it is currently emerging globally.

The infection produces fever, ulcers and lesions on skin, mouth, hooves, increased salivation, and sometimes bluish tongue, which is what gives the disease its name. Some viral strains can cause abortions in ewes and cows. The disease has no treatment and the most effective measures for its control are vaccinating animals and avoiding exposure to Culicoides.

The diseases **Maedi-Visna** in sheep and **caprine arthritis-encephalitis** of goats are caused by the same enveloped RNA virus, a lentivirus of the family of the retroviruses (similar to feline immunodeficiency or to human AIDS viruses). This virus only affects sheep and goats, and it can cause several different clinical forms: respiratory, mastitis, arthritis and encephalitis. The animals weaken progressively and they eventually die.

There is neither treatment for the disease nor effective vaccines. So, as with many other diseases, the best way to control the disease is the early detection of infected animals so that they can be separated from the herd.

The third disease is caused by prions, which affect the central nervous system, causing a **degenerative spongiform process** that ends up destroying the brain tissue causing the death of the animal. As you know, prions do not have nucleic acid and they are not real viruses, but they

are also dangerous. Prions that affects sheep and cows are very similar, but they give rise to two distinct diseases: scrapie in sheep and bovine spongiform encephalopathy (BSE) in the cows. In sheep, the disease is characterized by an intense itch, from where its name comes.

Scrapie has been known for centuries (though its cause was unknown) and it is believed that the BSE originated from the consumption of contaminated feed with the scrapie prion, which somehow adapted to the new animal species. Subsequently, this bovine prion was transmitted to people who ate meat contaminated with the pathogen, giving rise to what is known as "mad cow disease". This occurred at the end of the 20th century and it was necessary to detect and eliminate millions of cows that could host the pathogenic prion in their tissues to control the disease.

As you can see, we still have much to learn about viruses and illnesses in small ruminants. Viruses are amazing, don’t you agree?