

VIRAL DISEASES IN CATTLE

Welcome. There are many viral diseases that affect cattle, some of them have been known for centuries (such as rinderpest and FMD) while others are relatively recent (such as the BSE). Others, such as those transmitted by arthropods, are emerging (such as blue tongue).

The majority of the viral diseases that affect cattle have a world-wide distribution, and some of them produce significant losses in livestock production, associated with mortality, reproductive failures, and decrease in milk production or in the weight gain of animals. Because of their importance, some of these diseases are notifiable to the world Organization for Animal health, OIE.

The virus can affect all organs and tissues in cattle, but the most important viruses are those that affect:

- the respiratory tract, such as herpesvirus and paramyxovirus, especially in the feedlot calves,
- the digestive system, such as rotavirus and coronavirus, which are very aggressive in the new-born calves,
- and the central nervous system, especially the BSE-causing prions.

Some viruses cause ulcers and wounds on skin (especially of the hooves) and in the mucosa of the muzzle and mouth, such as the foot and mouth disease virus, the bluetongue virus or the IBR virus.

Lastly, some of these viruses are especially pathogenic in pregnant cows, in which they produce abortions and reproductive disorders of different types.

Many of the viruses that affect beef can produce different pathological forms depending on the age of the animals, their immune status or the infecting viral strain. This complicates diagnosis, prevention and control very much.

We will focus on three diseases that are of great concern for cattle farms nowadays, both dairy farms and beef farms, and that are notifiable to the OIE.

Let's start with **foot and mouth disease**. It is one of the most important diseases for domestic animals, since it affects cows, sheep and pigs. It is produced by a picornavirus, a very small naked RNA virus, which is highly resistant to environmental conditions and to many disinfectants. The virus is easily transmitted through saliva, faeces, aerosols, and milk, and it is able to spread through the air, water, food, vehicles, clothes and any material contaminated with the virus. That is why it is considered the most contagious virus of mammals.

In infected animals it produces lesions on the skin of hooves, and in the mucosa of the mouth and muzzle, which end up forming vesicles and ulcers. When these break they release millions of viruses that can infect other animals or contaminate any place or material in the farm. These lesions are very painful and prevent the animals from eating normally, and they can be so severe that animals never recover entirely. It is very difficult to control an outbreak of foot and mouth disease, and there is no effective treatment, so the only way to stop the disease is euthanizing all animals, both infected and susceptible.

If you want to see in which countries there are cases of foot and mouth disease you can consult the website of the OIE.

The other two viral diseases that we will see produce abortions and reproductive disorders in pregnant cows. They are the **bovine viral diarrhoea**, caused by a pestivirus of the family *Flaviviridae* (RNA viruses), and **infectious bovine rhinotracheitis**, caused by a Herpesvirus (DNA viruses). These viruses are capable of producing other alterations in cows in addition to abortions. In fact, the bovine herpesvirus is one of the main causes of respiratory disease in calves.

When these viruses infect a pregnant cow they are able to affect the placenta and the foetus, originating injury so severe that the foetus dies and there is abortion. Sometimes, depending on the age of the foetus and on the pathogenic capacity of the virus, they can lead to the birth of weaker calves or with severe congenital malformations. If they survive, they can be infected for all their life, and always be weaker. The prevention and control of these diseases is based on vaccinating heifers before their first pregnancy so that they have antibodies against the viruses and avoid foetal infection, and periodically inspect the livestock to detect and eliminate the infection early.

If you want to know more about these two diseases you can consult the additional material on the OIE website.

Finally, you may be wondering if any of the bovine viruses can affect people. And the answer is Yes, but fortunately only a very low number: some poxviruses and bunyaviruses, the rabies virus, and the BSE prion. It is another reason to check viral diseases in the cattle farms.