

Three viral diseases of pigs

Hello To discuss the viral diseases of swine we have chosen three very serious ones that produce clinical signs exclusively on pigs: African swine fever, the circovirus infection and the porcine reproductive and respiratory syndrome.

African swine fever

African swine fever is a highly contagious disease frequently fatal, which affects pigs of all ages. It is not a zoonosis, but it produces huge socio-economic losses, so it is a notifiable disease. In Europe, it is endemic in Sardinia. In 2007 an outbreak started in the Caucasus that has spread to Eastern Europe, reaching Poland, the Baltic Republics and Ukraine.

It is caused by a virus of the family *Asfarviridae*, which are large, enveloped viruses, with a highly variable double-stranded DNA genome.

It primarily affects the domestic pig, but also wild suidae, and ticks, which ingest the virus by feeding on sick animals and inoculate it to the next animal they bite. Swine can also become infected by direct contagion, between healthy and diseased animals, or indirect infection, when feeding on garbage containing infected meat, or by fomites.

The virus spreads by all body fluids and organs. Severe cases have a mortality rate of 100% within a period of 2 to 10 days. They are characterized by loss of appetite, depression, and bleeding. In less severe cases clinical signs are less obvious. There may also be chronic cases, even subclinical or unapparent, by which the animal remains as an unapparent carrier, transmitting the disease to others.

One problem is that the virus does not induce neutralizing antibodies, so there is not an effective vaccine. The disease is prevented by avoiding that the infection reaches farms, and once inside, the successful eradication depends on a rigorous slaughtering all pigs, cleaning and disinfection.

Porcine circovirus

Circovirus is produced by a member of the family *Circoviridae*, the porcine circovirus type 2 (PCV-2). It is an ubiquitous and insidious usually subclinical disease, that produces two main types of syndromes: post-weaning multisystemic wasting syndrome, and a reproductive syndrome. It is a multifactorial disease, in which the development of the clinical signs depends on factors such as co-infections with other pathogens.

PCV-2 affects only pigs, both domestic and wild. It is transmitted by direct contact between healthy and diseased animals and vertically if the sow is infected during pregnancy or acquires the virus sexually.

The PMWS, which is the post-weaning syndrome, primarily affects pigs 2 to 4 months of age. The virus replicates in lymphoid organs, producing immunosuppression. Hence they are distributed to the lungs, the liver and kidneys. The clinical manifestations include weight loss, pale mucous membranes, shortness of breath and diarrhoea.

If the sow is pregnant, the virus replicates in all the foetal tissues. The sooner in pregnancy the infection occurs, the worse the outcome for foetuses.

There is an effective vaccine but other factors must also need to be improved, such as vaccinating pigs against other pathogens or decrease the stress situations.

Porcine reproductive and respiratory syndrome (PRRS)

Porcine reproductive and respiratory syndrome, abbreviated as PRRS, is the most serious disease of intensive pig farms, and it is notifiable to the OIE. It is distributed all over the world. At the beginning of this century, in China emerged a variety still more virulent, which is causing real havoc in Asia.

It is caused by a virus of the family *Arteriviridae*. The PRRS virus presents the highest known rate of mutations, so it varies constantly and this greatly complicates diagnosis and vaccination. Their target cells are macrophages.

The virus is introduced into a farm with the arrival of infected animals, although there are data indicating that it can also be transmitted by fomites, or even by insects or by air. Pigs can become infected in utero and they are already infected when they are born, although they may not present clinical signs.

The reproductive syndrome is evidenced as a gestational failure in females. Typically the sows have mixed litters, composed by a variety of live and dead pigs.

The respiratory syndrome affects above all young pigs rather than adults. It is characterized by shortness of breath, fever and anorexia.

Prevention is based in establishing strict quarantines. Farms positive need to slaughter all pigs, clean and disinfect. There are commercial vaccines, mostly attenuated vaccines, although their effectiveness is undermined by the great variability of the virus that I mentioned earlier.

In modern farms, pigs are very sensitive to the different conditions and they can suffer from many diseases. These are three of the most important but there are many more. Thank you very much for your attention.