Porcine reproductive and respiratory syndrome (PRRS)

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Adapted from:
Photographs: Courtesy of Dr Gary Buhrmann (Western Cape Provincial Veterinary Services).

Introduction

Porcine reproductive and respiratory syndrome (PRRS), also known as ‘mystery disease of swine’ and ‘blue-eared pig disease’, has become one of the most important diseases of pigs in spite of the fact that it is no longer listed by the World Organisation for Animal Health (OIE). It made its debut in North America in about 1987 and in Europe (Germany) in 1990, but serological evidence suggested that it was present for some time in pig populations before clinical signs were observed, including in South Korea in imported pigs in 1985, and outbreaks occurred in Japan in 1988 and Taiwan in 1991. It manifested in commercial piggeries as a severe disease characterised by high fever, abortions in sows, high mortality in piglets and pneumonia in weaners and growers.

The agent proved difficult to pin down but was isolated almost simultaneously in The Netherlands and USA and proved to be a previously unknown virus in the genus Arterivirus of the family Arteriviridae. Its importance lies in the negative effects that it has on high-producing herds in some of the top pig-producing countries of the world and the difficulty of eradicating it once it has become established.

Salient features of PRRS

PRRS took the pig-producing world by surprise with its sudden appearance and subsequent rapid spread across continents. It has become endemic in most countries that it invaded. As it becomes established in herds the severity of the disease decreases and often no clinical signs are seen, but because it targets the immune system it makes infected pigs more susceptible to other infections and therefore leads to
production losses. The severity of respiratory infections, in particular, is often markedly greater in infected than in non-infected herds. Its insidious nature makes it difficult to eradicate. In 2006 high mortality occurred in pigs in China due to a syndrome named ‘high fever disease of pigs’. Although more than one disease agent was sometimes isolated from the victims, for example classical swine fever virus, the only consistent pathogen was a PRRS virus that proved to be genetically different from known PRRS viruses, including those that had circulated in China since 1995, and was able to induce the severe form of PRRS in the absence of other pathogens. The possible future appearance of more virulent PRRS viruses elsewhere is also therefore a concern.

Where does PPRS occur?
PRRS is widespread in North America, Europe and Asia, mainly in countries with highly developed pig industries. The southern hemisphere has been largely spared, with the exception of Chile, which achieved eradication after about 10 years in 2007 and Peru, where serological evidence for its presence was reported to OIE in February 2012. In Africa PRRS has only been reported from South Africa, with outbreaks occurring in smallholder pigs in the Western Cape in 2004 and 2007 that were rapidly eradicated by stamping out with compensation.

What triggers an outbreak of PPRS?
Most outbreaks of PRRS are initiated by the introduction of infected pigs, which are by far the most efficient transmitters of the virus. Spread by fomites and in semen has been confirmed. The situation with regard to airborne transmission is more problematic, as experiments have failed to achieve transmission over distances greater than one or two metres, but it is argued that documented cases of infection of pigs a considerable distance from the nearest source of infection must be due to either airborne or arthropod-borne transmission. The meat of infected pigs is generally considered to pose a low risk of transmitting the virus in spite of the fact that this route of transmission proved possible if large amounts of infected meat were fed to pigs that had previously been starved. Lengthy persistence of the virus has only been demonstrated in lymphoid tissues and less than 2% of pigs are likely to be viraemic at slaughter. The South African outbreaks were suspected to have resulted from swill feeding but this was never proven, and no outbreaks elsewhere have ever been attributed to that source.

Prevention and control
Prevention of PRRS depends on the implementation of adequate biosecurity measures on pig farms. The PRRS virus is unable to survive for long periods outside the pig and is inactivated by a wide variety of disinfectants as well as elevated temperatures and desiccation. The main problem is likely to be airborne transmission in pig-dense areas in cool moist climates, where the minimum recommended distance of 4 km between different pig farms and from roads along which pigs are transported may not be achievable. Vaccines are available but their efficacy has proven variable, owing to inability to protect against all the different viruses as well as suppression of the immune response by the virus, and their use does not result in eradication. For infected herds, preventing possible secondary infections is important because of the immune-suppressive effects of the virus. Although many countries produce pigs successfully in spite of the presence of PRRS, profits are lower and the investment in biosecurity as well as in measures to rid herds of the disease is likely to be worthwhile because the incidence of other diseases will also be reduced.

Find out more
The CPD module on PRRS describes the aetiology and epidemiology of PRRS, how to recognise it and confirm the diagnosis, the effects it has had on pig production in North America, Europe and Asia, and the on-farm biosecurity measures needed to prevent it.
Other relevant CPD courses

- Classical swine fever
- African swine fever
- Biosecurity