Poxvirus in a swine farm in Italy: a sporadic outbreak?

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SUMMARY
The aim of this report is to describe the occurrence of a Swinepox virus (SWPV) outbreak in Central Italy in 2013 and the possibility of its reappearance. SWPV is the only member belonging to the Suipoxvirus genus in the Poxviridae family and it represents the etiologic agent of a worldwide disease specific for swine with an affinity for epidermis. In Italy it has been rarely observed. In November 2013 an outbreak was registered in a biological farm of about 110 animals located in Tuscany. Skin lesions were observed in a group of 3 months old piglets born in the farms from crossbreed animals. The disease affected 50 of the youngest animals. Diagnosis was based on clinical and pathological signs which were pustular lesions at first located mainly around the neck and the ears and in a later stage disseminated all around the body, especially concentrated in the groin and the abdomen. Skin samples were processed for negative staining electron microscopy technique and ruled positive for brick viral particle consistent with Suipoxvirus. To rule out Orthopoxvirus infection, possibly causative of similar pustular lesions, molecular analysis was performed but no evidence of specific target amplification for Orthopoxvirus was observed, thus it was excluded as differential diagnosis. The course of the disease was of about 20 days. As a concomitant infection with Salmonella tiphymurium was found in the outbreak, it is not possible to define which of the two diseases could have been causative of the registered mortality. Unfortunately the source of the poxvirus infection has not been demonstrated, however a great role in the transmission of the disease within the farm could be attributed to the lice Haematopinus suis which was parasiting the animals. As Suipoxvirus is mechanically transmitted by lice and extensive farming systems are common in the area, as well as wild boars, future outbreaks could be expected.

KEY WORDS
Swinepox, Suipoxvirus, swine, wild boar, Italy.

This short communication reports on an outbreak of swine pox in a biological pig farm in Tuscany, Italy. Swinepox virus (SWPV) is the only member belonging to the Suipoxvirus genus in the Poxviridae family and it represents the etiologic agent of a worldwide disease specific for swine with an affinity for epidermis. Suipoxvirus is morphologically, genetically and antigenically related to the others 8 genera of the subfamily Chordopoxvirinae. This virus presents a brick-shaped complex envelope and a large linear double-stranded DNA genome with a cytoplasmic site of replication. SWPV produces generalized pustular lesions which in severe infections can be associated with a high rate (80% or more) of neonatal illness. It is mechanically transmitted by lice or through direct animal contact and a congenitally-acquired infection is described in literature. The presence of Poxvirus in swine has been demonstrated in Northern Italy since 2002. However in central Italy, the disease was first reported in slaughtered pigs in 2006 (data not published). In November 2013 a new outbreak was registered in a biological farm of about 110 animals located in a different area in Tuscany. Skin lesions (Figure 1) were observed in a group of 3 months old piglets born in the farms from crossbreed animals of the indigenous breeds “Macchiaiola maremmana”, “Nero dei nebrodi” and the English breed “Large Black”. The disease affected 50 of the youngest animals. “Large White” pigs kept in the same farm didn’t show any signs of illness. At a first site an ectoparasiticide was dispensed to all the animals while an antibiotic and cortisone treatment was administered to the ill animals. As the condition didn’t show any improvement and instead kept deteriorating, a first suspect of poxvirus was formulated. Diagnosis was based on clinical and pathological signs which were pustular lesions at first located mainly around the neck and the ears and in a later stage disseminated all around the body, especially concentrated in the groin and the abdomen. One dead animal was submitted to the Diagnostic Laboratory of the IZSLT for post-mortem examination. Skin samples were sent to the Biotechnology Laboratory of the IZS LT to investigate for viral agents.
Figure 2 - Electron micrography image of skin lesion sample showing a negatively stained brick viral particle of ≈ 160-220 nm, consistent with Suipoxvirus. Scale bar = 100 nm.

They were processed for negative staining electron microscopy technique⁹ and ruled positive for brick viral particle consistent with Suipoxvirus (Figure 2). Vaccinia virus can also cause similar pustular disease in pigs, impossible to be clinically distinguished from swine poxvirus, as well as the TEM morphology⁹. To rule out Orthopoxvirus infection molecular analysis was performed; in particular, PCR tests, targeting two different regions of Orthopoxvirus genome, i.e. cytokine response-modifying protein B (crmB) gene¹⁰ and hemagglutinin gene (HA)¹¹, were carried out. No evidence of specific target amplification was observed with both assays. Furthermore no smallpox vaccination had been executed in the area since many years. The course of the disease was of about 20 days. As a concomitant infection with Salmonella tiphymurium was found in the outbreak, it is not possible to define which of the two diseases could have been causative of the registered mortality. As well the source of the poxvirus infection has not been demonstrated. Although only fences divide the farms from the surrounding area inhabited by wild boars, since now no cases have been reported in this species. On the other hand, a great role in the transmission of the disease within the farm could be attributed to the lice Haematopinus suis which was parasiting the animals. It is known that this parasite permits the survival of the virus for one year² and this could be the reason of the following less severe outbreak in piglets registered in the same farm in June 2014. Although ectoparasite treatments are dispensed as well as bio-control security measures to avoid contact with wild boars, lice eradication in semi-extensive farming systems is difficult and thus other cases are likely to be expected within the territory in the future.

References