Istituto Zooprofilattico Sperimentale delle Venezie

Swine mycoplasmosis

Mycoplasmosis are responsible for important economic losses in the **pig sector**. Mycoplasmosis in pigs is caused by bacteria belonging to the genus *Mycoplasma* spp., class *Mollicutes*. *Mollicutes* are capable to infect different hosts (mammals, birds, reptiles and plants). The most relevant mycoplasma species causing disease in pigs are: *M. hyopneumoniae*, *M. hyorhinis*, *M. hyosynoviae*, *M. suis*.

As in other livestock sectors, mycoplasma infection is characterized by **high morbidity, low mortality and tendency of the disease to become chronic.** The economic losses are linked to the costs sustained for prophylaxis and therapy, as well as to production losses.

The new **holistic approach to multifactorial and/or chronic diseases** applied in both human and veterinary medicine has certainly increased the awareness of clinicians of these microorganisms that are characterized by a high evolutionary rate. Even though mycoplasmas are historically considered as "opportunistic pathogens" (with the exception of some species), they are gaining interest in the livestock with consequent increase of the demand for diagnostic testing.

Here below are listed the **most important mycoplasma infections in pigs**:

- *M. hyopneumoniae:* swine enzootic pneumonia;
- *M. hyorhinis*: polyserositis and arthritis in piglets during the post-weaning period; conjunctivitis, otitis, meningoencephalitis, and abortion;
- *M. hyosynoviae*: arthritis in pigs during the growing-finishing stage;
- *M. suis* (formerly *Eperithrozoon suis*): swine infectious anemia (unculturable).

IZSVe activities and services

Over the years, the Istituto Zooprofilattico Sperimentale delle Venezie has implemented various **methods for the diagnosis** of mycoplasmosis in pigs.

Intra-vitam diagnosis

A **biomolecular method (a multiplex real-time PCR)** is available for the detection of *M. hyopneumoniae* and *M. hyorhinis*. This test, that can be performed on various biological matrices, is carried out at the Laboratory of Pathology and Welfare of the Swine Species in Pordenone (SCT4). This test can be requested for diagnosis with ongoing clinical pathology.

Furthermore, an indirect diagnosis of *M. hyopneumoniae* infection can be made through detection of specific antibodies in serum samples using the ELISA method.

Post-mortem diagnosis

The **biomolecular method (a multiplex real-time PCR)** can be used for the detection of *M. hyopneumoniae* and *M. hyorhinis* can be performed on various biological matrixes (lung, joint fluid, pericardial fluid, eye

swab) collected at necropsy. The molecular test can be used for the confirmation or the exclusion of the the diagnostic suspect.

Furthermore, the IZSVe provides a whole **panel of diagnostic tests** for the isolation of mycoplasmas that is applicable to different biological matrixes. Biological samples can be collected and conferred to the ***Mycoplasma* Operational Unit** of the diagnostic laboratory at SCT1 Verona. This laboratory started developing its methods primarily poultry mycoplasmas and, subsequently, developed methods for the isolation of mycoplasmas affecting the other livestock sectors (cattle, small ruminants, pigs).

The Mycoplasma Operational Unit is able to determine the species of the isolates through a **molecular test** (16S rRNA PCR-DGGE). This method allows also to detect more than one mycoplasma species in the same sample. The methods is able to discriminate among different genera of the *Mollicutes* class (*Mycoplasma* spp., *Acholeplasma* spp. and *Ureaplasma* spp). Furthermore, this method, if associated with further biomolecular investigations, such as 16S rRNA gene sequence analysis, allows the identification of novel species of *Mollicutes* (emerging pathogens).

The **combination of the microbiological method with the molecular one** makes it possible to detect the presence or co-presence of mycoplasma species relevant to the pig sector, providing important information on the epidemiology and clinical-pathological manifestation of swine mycoplasmosis.

Antimicrobial susceptibility and resistance

The strains of pathogenic mycoplasmas of veterinary importance are subjected to determination of the MIC (Minimum Inhibitory Concentration) against the most commonly used antimicrobial compounds.

Over time, this activity made it possible to create a **database of drug-sensitivity data for the most relevant mycoplasma species**. This data collection is particularly useful for therapy formulation and control of microbial populations. In this way it was possible to find critical issues regarding specific classes of antibiotics/pathogens ("preparedness"), fulfilling the requests of international health organizations regarding the **rational and responsible use of drugs in the veterinary field**.

Finally, the **availability of isolates of pathogenic mycoplasmas** isolates and their cryopreservation in biobanks allows their use for the production of antigens, for further investigations or for the development of new tests (genotyping, experimental infections and stabulogenic vaccines).

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