Classical Swine Fever
Summary

Introduction

1. This note provides a brief summary of an analysis undertaken by a DISCONTOOLS group of experts on Classical Swine Fever (CSF). They reviewed the current knowledge on the disease, considered the existing disease control tools, identified current gaps in the availability and quality of the control tools and finally determined the research necessary to develop new or improved tools. Full details of the analysis can be downloaded from the web site at http://www.discontools.eu/.

Disease profile

2. CSF is endemic in parts of Asia, Africa, Southern America, and parts of Eastern Europe where there are recurrent relapses in areas where the virus is endemic in the wild boar population. It was eradicated in Australia (1962), Canada (1962), New Zealand (1953), USA (1978). In the EU, CSF was last reported in Latvia in 2015. Occasionally outbreaks recur in highly industrialised countries. The introduction of CSF into a disease-free country has a disastrous effect on the pig industry and the economy. There is a high economic impact especially in areas with high pig density and with the loss of export markets for pigs and pork products associated with the consequent movement and trade restrictions. CSF can also impact on poor communities in countries with back yard pig production where pigs are used to supplement income.

3. Due to increased world-wide traffic, intensified trade contacts and tourism the risk of (re-) introduction of the disease has increased. Spread of disease might also be facilitated by intensified contacts and the factors mentioned above.

Risk

4. The occurrence of low virulent strains in recent decades has made the diagnosis more problematic. In addition, endemic CSF in wild boar threatens the domestic pig population of the country of origin and neighbouring countries.

5. A number of other factors increase the risk. These include difficulties in the clinical diagnosis in domestic pigs due to variability of symptoms, coinciding with emergence of other diseases with similar clinical presentation (PDNS, PRRS). There is a reluctance of veterinarians to include CSF in the list of differential diagnoses with a lack of awareness by both farmers and veterinarians especially in countries free of the disease. In addition, lack of managerial skills and practice, poor biosecurity, illegal swill feeding and the illegal import of meat from infected areas due to imperfect control measures on global trade all contribute to the risk. Other risks are linked to traditional methods of dry-curing to produce local delicacies and to illegal swill feeding especially of material originating from wild boar.

Diagnostics

6. The quality of diagnostic products varies and sometimes availability of certain test kits is problematic. Commercial ELISA kits are available by different manufacturers, both for antigen and antibody detection. In addition, commercially available monoclonal antibodies and conjugates can be used for different staining techniques. Easy-to-perform penside tests for the detection of CSFV-specific antibodies are available but have deficiencies in terms of sensitivity. For detection of viral RNA commercial real-time RT-PCR kits targeting different regions of the viral genome are available. RT-PCR has been found to be the most sensitive method for detection of CSF virus. In general, it can be said that from an RT-PCR negative result it can be concluded with a very high confidence that the tested animal or tissue sample is not infectious to other pigs at the moment of sampling. The available marker ELISAs that correspond to the licensed CSF marker vaccine Suvaxyn (CP7_E2alf) to distinguish infected from vaccinated animals have limitations in particular with respect to specificity and are not suited for individual animal testing.

Vaccines

7. Vaccination with modified live virus strains is effective and safe in preventing losses and eradication of the disease provided that accompanying control measures are implemented. In countries which are free of disease, or where eradication is in progress, vaccination is usually prohibited. Different variants of the C-strain live vaccine are available worldwide. Live vaccines are widely used for domestic pigs as injection vaccines and for wild boars as oral vaccines. Local vaccines of undefined quality are available in some countries. At the moment (July 2023), modified live (MLV) “C-strain” and the live DIVA “CP7_E2alf” vaccines are available as CSF-vaccines in the European Union. However, the BVDV backbone in “CP7_E2alf” vaccine impedes a reliable differentiation of vaccinated from infected animals on individual level. Improved combinations of live DIVA vaccine candidates and accompanying diagnostic tests have been developed. Due to financial and political restraints availability of vaccines is limited in some countries resulting in insufficient vaccine coverage.

Pharmaceuticals

8. There is no therapy for CSF and in Europe any treatment is forbidden by EC legislation. Antiviral substances which prevent or diminish the shedding of CSF virus by infected pigs might offer new additional tools for CSF control.

Knowledge

9. CSF virus has only one serotype, although some minor antigenic and genomic variability between strains can be shown as different genotypes. There is considerable variability in course of infection and virulence: acute (high mortality – up to 100%), sub-acute (lower morbidity and mortality rates), chronic (few animals affected – always fatal), and some asymptomatic cases. The outcome of the disease is influenced by the infecting virus isolate as well as age and immune status of the infected pig. The only natural hosts known are members of the family *Suidae* including domestic pig and wild boar. Chronically and persistently infected (PI) animals may occur and may shed the virus for months. Infected pigs and wild boar are the only reservoirs in Europe. There is serological cross-reaction with ruminant pestiviruses. There are knowledge gaps in a number of areas which include pathogenesis, immunity, transmission and spread, reservoirs, and geographical distribution. Full details of these gaps are shown in the Disease and Product Analysis available on the DISCONTOOLS web site.

Conclusions

10. CSF remains a major health and trade problem for the pig industry. In endemic countries or those with a wild boar reservoir, CSF remains a priority for Veterinary Services. Surveillance as well as stamping out and/or vaccination remain principle tools of prevention and control, depending on the context. A number of vaccines and diagnostic tests are available in Europe and worldwide. Technological advancement in both domains would be desirable. Due to a relatively high number of fairly performing diagnostic tools and vaccines on the market, it is unlikely that the industry will invest in new technologies, unless external funding sources can be mobilized within the context of formal research and development networks.