DISCONTOOLS

Sheep pox and goat pox
Summary

Introduction

1. This note provides a brief summary of an analysis undertaken by a DISCONTOOLS group of experts on sheep pox and goat pox (S&GP). 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. Sheep pox virus (SPPV) and goat pox virus (GTPV) belong to the genus Capripoxvirus and are both antigenically and genetically closely related to each other and to Lumpy skin disease virus (LSDV), the third member of the genus Capripoxvirus. All three viruses, nevertheless, are considered distinct species. Only sheep and goats are the natural hosts of SPPV and GTPV. There is a breed-linked predisposition and the disease is dependent on the strain of capripoxvirus. Strains of SPPV do pass between sheep and goats, and vice versa. Typically, however, distinct host preferences exist such that most strains of SPPV or GTPV exhibit greater virulence in the homologous host, while some are equally virulent in both species. No carrier status has been recognized following infection with either virus.
3. The mortality rate varies but in the endemic areas may be between 5 and 10%. It can approach 100% in imported sheep which are fully susceptible. Both viruses survive for many years in dried scabs at ambient temperatures. Insect vectors potentially play a role in transmission of SPPV and GTPV.

Risk

4. Most of Europe and the Americas are free from endemic sheep pox although sheeppox has made frequent incursions into Greece 2015-2018. There is a need to identify high risk countries where there is potential spread of disease. e.g. from Turkey into Greece and from China into Vietnam and Mongolia. Both SPPV and GTPV have a long incubation period and are easily spread by direct and indirect contact. Animals accidentally or intentionally infected could travel a considerable distance before showing disease, and could then disperse and spread disease.

5. Capripoxviruses are a potential animal bioterrorist agents as they i) cause high morbidity and mortality, ii)) have potential for rapid spread, iii) have potential to cause serious socio-economic consequences and iv) are of major importance in the international trade of animals and animal products.

Diagnostics

6. Commercial diagnostic tests are available for detection of CPPV genetic material (PCR-based tests) and antibodies against CPPVs (ELISA-based tests).
7. Current PCR methods are suitable for the detection of viraemic animals and virus persistence in the skin, mucous membranes, saliva, eye and nasal discharges, and semen.

Vaccines

8. Live attenuated strains of CPPV provide long-term immunity against disease (at least 1 year). These live-attenuated vaccines exhibit within-genus cross-protection.
9. Several live-attenuated vaccines made from different strains of capripoxvirus are currently available. The quality of these vaccines varies. Information on the effectiveness and efficacy of CPPV vaccines would benefit vaccination programmes.
10. Recombinant capripox-based vaccines to control more than one small ruminant disease have been reported in the literature.

Pharmaceuticals

11. These are unlikely due to a lack of a profitable market.

Knowledge

12. There are still significant areas of uncertainty in the understanding and knowledge about the S&GP especially in relation to pathogenesis, immunology, vaccinology, and epidemiology. For example the role of potential insect vectors in transmission of disease requires clarification, immunological correlates of protection, and the mechanism/s underpinning the host range of the viruses.
13. Despite these knowledge gaps, many of the currently available live-attenuated CPPV vaccines are safe and effective.
14. The emphasis of S&GP research should therefore be on epidemiological and economic evaluation of prevention and control measures that are tailored to specific countries / regions.

Conclusions

15. SP and GP are primarily a problem in developing countries. The current research should focus on design and promotion of vaccination campaigns using safe and effective live attenuated vaccines, in combination with education of farmers through extension activities, and effective implementation of regulations to avoid use of poor vaccines. If all these aspects are taken care of well, the control and eradication of the disease will be a reality globally. Like smallpox, it is possible to eradicate capripoxvirus through vaccination.