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PANORAMA

Thematic portfolio

African swine fever: responding to the global threat

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EDITORIAL

Importance of global ASF control

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The global spread of African swine fever (ASF) has been unprecedented in recent years, with a growing number of countries in different regions reporting outbreaks of the disease. Countries affected by ASF struggle to control and minimise losses, while countries that are still ASF free face an increasing risk of the disease's introduction. Owing to the global socio-economic repercussions, controlling ASF is a high priority for both affected countries and those free from the disease.

Controlling ASF remains a challenge due to its complex epidemiology; the lack of a safe and effective vaccine, means that strict biosecurity is required for control; and the immense difficulty in implementing the necessary measures and changing high-risk practices within the diverse and demanding scenarios that many countries face. The task can be compounded by a lack of: political support, technical capacity and sustainable resources.

To respond to this challenge, there is an urgent need to revise the current understanding of ASF, facilitate the development of adequate scientific approaches and effective tools, increase commitment and support of governments, improve the technical capacities of Members, and engage in effective risk communication with the relevant stakeholders and development partners.

The Global Initiative for the control of ASF is coordinated by the OIE and FAO

The World Organisation for Animal Health (OIE), in coordination with the Food and Agriculture Organization of the United Nations (FAO), has been working diligently to address such needs, by providing international standards and best practices for the effective control of ASF, improving transparency of new and evolving outbreaks via the World Animal Health Information System (WAHIS), implementing diverse, technical capacity-building activities, and

launching awareness campaigns.

However, to implement these and other key activities effectively, well-coordinated national, regional and global efforts will be required, not only by governments and public institutions, but also by a range of different stakeholders who participate in pig production and trade value chains.

To assist in this, and to answer the call for action by our Members, the Global Initiative for the control of ASF has been launched under the GF-TADs(1) framework in coordination with the OIE and FAO. The initiative will provide the global strategic framework to carry out commensurate actions, and harmonise partnerships and coordination at the national, regional and international levels, taking into consideration those programmes that already exist.

> OIE Members must lead these efforts and drive the changes necessary to achieve global control of ASF

Nevertheless, it is the Members of the OIE, supported by international organisations, regional economic communities and development partners, who must lead these efforts and drive the changes necessary to achieve global control of ASF.

The articles presented in this issue of *Panorama* will provide an overview of global ASF control, highlighting some of the ongoing OIE actions, key characteristics of the disease, an update of the global situation, recent experiences and lessons learned, and the role of key partners.

I wish to thank the authors for their contributions and hope you find this issue useful and informative.

Monique Éloit
Director General
World Organisation for Animal Health (OIE)

(1) The Global Framework for the Progressive Control of Transboundary Animal Diseases (GF-TADs) is a joint initiative of the OIE and FAO that endeavours to empower global and regional alliances in the fight against Transboundary Animal Diseases (TADs), to provide for capacity building and to assist in establishing programmes for the specific control of certain TADs based on global and regional priorities.

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JOINT ACTIONS

Global control of ASF

A GF–TADs initiative. 2020–2025

KEYWORDS

#African swine fever (ASF), #disease control, #Food and Agriculture Organization of the United Nations (FAO), #Global Framework for the Progressive Control of Transboundary Animal Diseases (GF-TADs), #Global Initiative, #World Organisation for Animal Health (OIE).

AUTHORS

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Recognising the heightened global risk of African swine fever (ASF), and the significant impact of the disease on animal health, food security and national and global socio-economics, the World Organisation for Animal Health (OIE), in collaboration with the Food and Agriculture Organization of the United Nations (FAO), was asked to launch a global initiative to control ASF at the 87th General Session of the World Assembly of Delegates of the OIE [1]. The aim of the global initiative is to tackle the strategic challenges posed by ASF, promote partnerships, strengthen prevention and preparedness measures and minimise the adverse impacts of the disease. It was decided that GF–TADs(1) would be the ideal platform from which to do this, as it fosters regional alliances and also provides opportunities for synergies with existing control strategies for other transboundary animal diseases.

Theory of change

A theory of change[2] was developed for GF-TADs and translated into a logical framework that describes indicators and outputs (Fig. 1), according to the following three objectives, around which various work plan activities are designed:

- Objective 1. Improve the capability of countries to control (prevent, respond to, eradicate) ASF, using OIE standards and best practices that are based on the latest science
- Objective 2. Establish an effective coordination and cooperation framework for the global control of ASF
- Objective 3. Facilitate business continuity.

An operational plan was then formulated that defines the specific activities to be carried out.

> Although ASF control is feasible, success requires regional and global coordination

The global initiative will effectively address the mandate given to the OIE and FAO by providing the structure through which to carry out the activities required to achieve the outputs and outcomes that will lead to the global control of ASF. This structure is based on the knowledge that control is feasible with current risk mitigation tools, but success will require strong national leadership, supported by regional and global coordination.

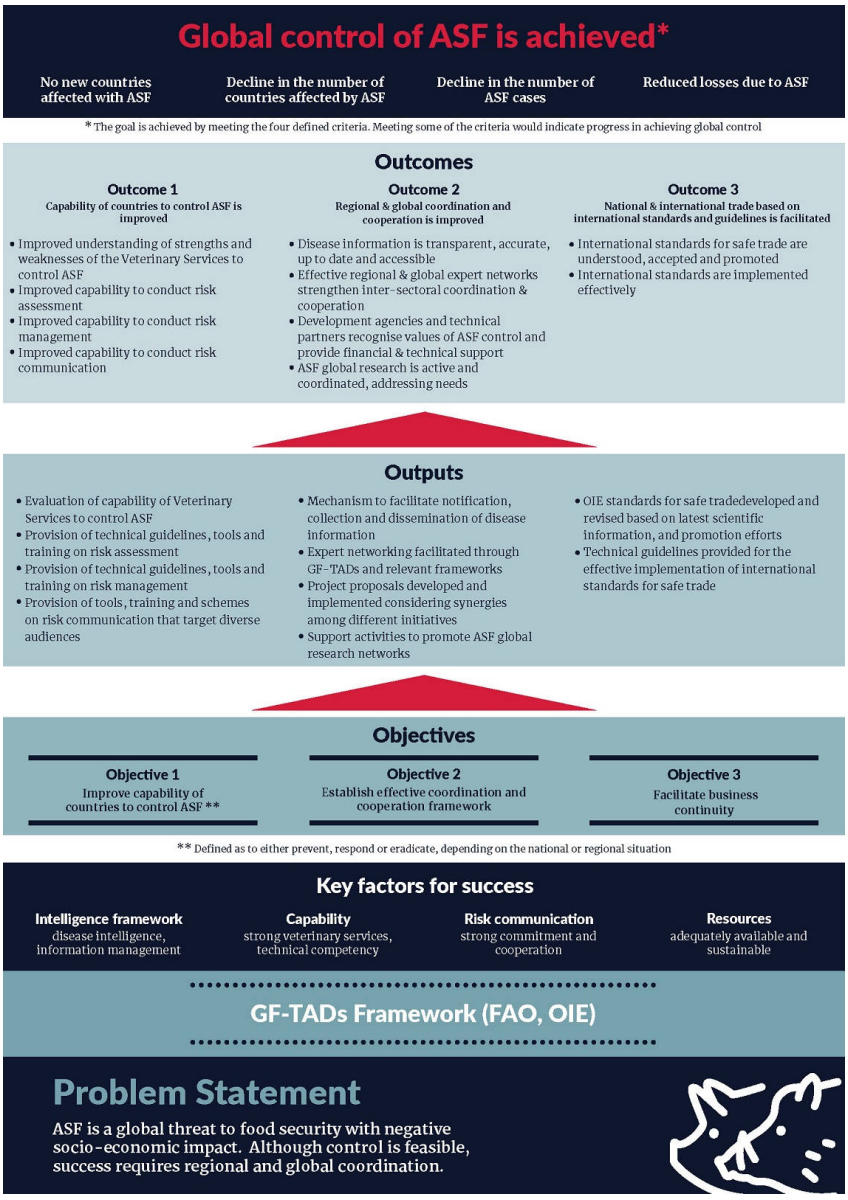

Fig. 1. Theory of change for the global initiative for the control of African swine fever

(1) The Global Framework for the Progressive Control of Transboundary Animal Diseases (GF-TADs) is a joint initiative of the OIE and FAO that endeavours to empower global and regional alliances in the fight against Transboundary Animal Diseases (TADs), to provide for capacity building and to assist in establishing programmes for the specific control of certain TADs based on global and regional priorities.

(2) A theory of change is a full description of how a desired change is expected to happen in a specific context. It identifies the conditions that must be in place for the proposed activities to achieve the desired goals, thus improving planning and evaluation.

http://dx.doi.org/10.20506/bull.2020.1.3116

Access the ***Global control of African swine fever*** document

OIE portals on African swine fever

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JOINT ACTIONS

Standing Group of Experts on ASF for Europe

SUMMARY

The Standing Group of Experts on African Swine Fever for Europe was set up in 2014 under the GF-TADs umbrella, to build closer cooperation among countries affected by African swine fever. This group has provided a model approach to implement disease control measures at the global level.

KEYWORDS

#African swine fever (ASF), #Europe, #Global Framework for the Progressive Control of Transboundary Animal Diseases (GF-TADs), #Standing Group of Experts (SGE).

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In response to the current global spread of African swine fever (ASF), a Standing Group of Experts on African Swine Fever (SGE–ASF) for Europe was set up in 2014 under the GF-TADs umbrella,[1] to build closer cooperation among countries affected by ASF and to address the disease in a more collaborative and harmonised manner across Europe.

Since 2014, and with the support of the European Commission, the SGE-ASF has met 14 times, covering many different strategic topics related to the prevention, control and eradication of ASF. Recommendations were drafted to encourage countries to take action to improve transparency, biosecurity, surveillance, hunting practices, long-term management of feral pigs, awareness campaigns, border controls, investigation of outbreaks, and data collection and sharing.

The SGE-ASF for Europe represents an opportunity to promote fruitful regional discussion and increased transparency among both affected and non-affected countries in Europe. The GF-TADs platform offers the ideal framework to discuss and exchange information on mitigation measures, based on scientific and technical grounds.

All participating countries are asked to put in place the recommendations drafted during the SGE–ASF meetings. Unaffected countries are able to take advantage of the experience of other countries. In addition, a GF-TADs team of experts offers on-the-spot support for preparedness, control and eradication activities to both ASF-affected and non-affected countries.

The growing importance of this initiative was demonstrated during its 14th meeting, which took place in Sofia, Bulgaria, from 10 to 11 September 2019. Representatives of 34 European countries attended, as well as a representative of the People's Republic of China. During this meeting, a high-level ministerial session was organised to call for ASF coordination, awareness and preparedness in South-East Europe.

Other regions have taken note of the significant role played by the GF–TADs in Europe and by its SGE-ASF, and are building synergies and designing activities to follow its example. Recently, GF-TADs for Asia and the Pacific and GF-TADs for the Americas launched similar campaigns, with the aims of building and strengthening regional expertise, exchanging knowledge and supporting these regions in the prevention, early detection and control of ASF.

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More information on the Standing Group of Experts on African Swine Fever for Europe
OIE portal on African swine fever

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JOINT ACTIONS

Standing Group of Experts on ASF for Asia

KEYWORDS

#African swine fever (ASF), #Asia, #Global Framework for the Progressive Control of Transboundary Animal Diseases (GF-TADs), #Standing Group of Experts (SGE).

AUTHORS

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The arrival and subsequent spread of African swine fever (ASF) in Asia in August 2018 has had far-reaching effects, and is acutely felt in areas where pig production may be a community's main source of livelihood, income and protein. Large-scale losses as a result of ASF have occurred in areas where the majority of the world's domestic pig population is raised.

The Standing Group of Experts (SGE) on ASF for Europe was established in 2014 under the GF-TADs umbrella[1] to enhance cooperation between countries affected by ASF. In close collaboration with the SGE for Europe, a similar SGE-ASF for Asia was launched early in 2019. Its aim is to share current knowledge on ASF and the emerging situation, and to enhance preparedness and prevention activities in the region.

African swine fever is truly a transboundary disease

Since ASF was first confirmed in the People's Republic of China in August 2018, the disease has spread to Mongolia,

Vietnam, Cambodia, the Democratic People's Republic of Korea, Laos, Myanmar, the Philippines, the Republic of Korea and Timor-Leste (Fig. 1). The SGE-ASF for Asia serves as a vital platform to coordinate and share information. It is working to bring together national and regional experts with experience of working on ASF and other swine diseases, as well as experts from other disciplines, such as economics, communication, anthropology and sociology. Together, it is hoped that we can better understand the drivers that influence the spread of ASF, and work towards changing the behaviours and practices that are contributing to its continuing spread.

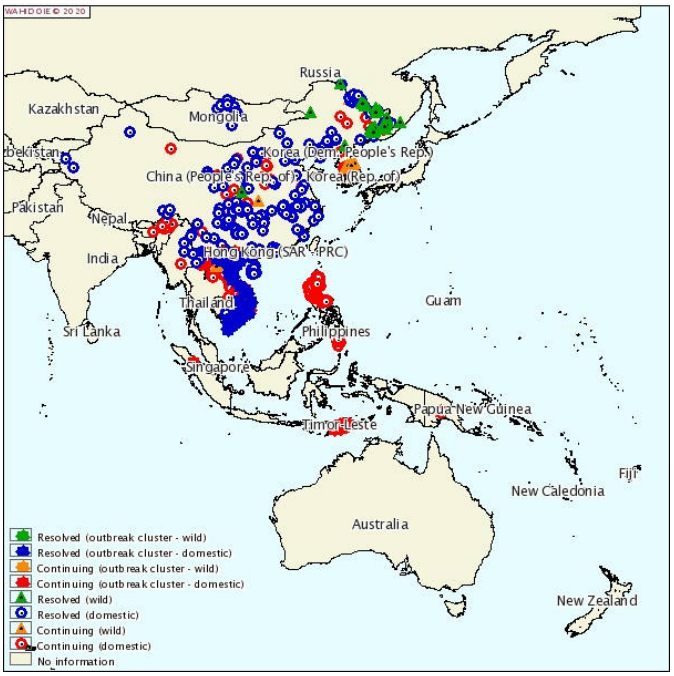

Fig. 1. Status of African swine fever outbreaks reported in Asia–Pacific (August 2018 – 29 June 2020)

During the first two meetings of the SGE-ASF for Asia, technical discussions focused on current knowledge about the epidemiology of the disease, surveillance for early detection, and how to implement biosecurity and border control measures in Asia.

The third meeting was held in Vietnam in November 2019 to highlight risk communication and the socio-economic impacts of ASF in Asia. We know that the disease spreads rapidly and over long distances, mainly through human activities, so understanding the human factor is vital. During regional festivities, there is a seasonal increase in travel and food consumption, so raising awareness of ASF and how it spreads is especially important during this time.

> A coordinated multilateral and multisectoral approach is needed to tackle the disease

Understanding pig production systems, cultural practices and socio-economic drivers is important if we are to more clearly understand how ASF is spreading, predict future trends and work to control the disease. ASF is truly a transboundary disease, and thus requires a coordinated multilateral and multisectoral approach to tackle it

effectively.

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More information on African swine fever in Asia
Communication tools
ASF Watch

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JOINT ACTIONS

Standing Group of Experts on ASF for the Americas

KEYWORDS

#African swine fever (ASF), #Americas, #Global Framework for the Progressive Control of Transboundary Animal Diseases (GF-TADs), #Standing Group of Experts (SGE).

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Although the Americas are free from African swine fever (ASF) at present, some countries experienced incursions and eradicated ASF in the 1970s and 1980s. With more than 177 million

pigs in the region today, and a more globalised world, the threat is immense and the impact of an incursion on economies, food security and animal welfare would be far-reaching. Continued collaboration at the regional level is our best defence to prevent the disease and mitigate its impact.

In September 2019, the Regional Steering Committee of GF-TADs[(1)] for the Americas met in Panama and agreed to create a Standing Group of Experts (SGE) on ASF. Enhancing regional cooperation was a key recommendation of the ASF Forum (Ottawa, Canada, April 2019) [1] and the subject of Resolution No. 33, adopted at the 87th General Session of the World Assembly of Delegates of the OIE (May 2019) [2, 3].

The America's SGE-ASF is chaired by Canada and includes Regional Representatives of the World Organisation for Animal Health (OIE) and the Food and Agriculture Organization of the United Nations (FAO), Brazil, Chile, Colombia, Guatemala, Cuba, Jamaica, the United States of America, the Latin American Pig Producers' Organisation (Organización Iberoamericana de Porcicultura – OIPORC), and relevant international partner organisations. External experts are invited to discuss priority topics [4].

To prepare for this meeting, the Executive Board of the OIE Regional Commission for the Americas decided to survey the region's countries to assist in prioritising areas for strengthening preparedness for ASF, and opportunities for exchange. Two questionnaires were sent to all countries in the Americas – both OIE Members and non-OIE Members – to assess the risk of ASF entry and the region's state of preparedness. The questionnaires were originally developed by FAO and had previously been successfully used in Asia and Africa. The survey was conducted by the OIE Regional Representation for the Americas and the analysis was performed by Canada. The results of the survey highlighted both the legal and illegal importation of pork products from infected countries as the major risk pathway for ASF. This drives home the point that border control is of primary importance. The main gaps in capacity relate to preparedness planning.

The first meeting of the Standing Group of Experts focused on border control

Given its importance, border control was the focus of the first meeting of the SGE-ASF, held in Bogotá, Colombia, in December 2019. Representatives of the Veterinary and Border Control Services and other experts attended, emphasising the need for strong collaboration between these sectors. The meeting resulted in several recommendations to ensure strict border controls, which were disseminated to countries [5].

The second meeting of the Standing Group of Experts focused on risk factors

The 2nd meeting of the SGE-ASF for the Americas was held on 15 June 2020. The general objective of the meeting was to develop recommendations that would make it possible to evaluate the risk factors present in the Americas' region for the introduction of the ASF virus [6].

Future topics include emergency preparedness, business continuity, and the role of wild and feral pigs.

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OIE portal on African swine fever

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OIE ACTIONS

Risk communication: a key element in the response to ASF

KEYWORDS

#African swine fever (ASF), #communication, #risk, #World Organisation for Animal Health (OIE).

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As long as no effective vaccine or treatment against African swine fever (ASF) is available, prevention remains essential to limit its spread.

Limiting the spread of ASF through efficient communication

Veterinary Services around the world are working exhaustively to prevent and control ASF. However, as the disease is transmitted mainly by human carelessness, transdisciplinary and intersectoral collaboration is needed. It is important that all those who might be involved in the direct and indirect transmission of ASF are made aware and acknowledge the importance of their actions, and understand how they can contribute to stopping the spread of this deadly pig disease. In this scenario, efficient risk communication becomes an essential component of the disease response.

Yet communication challenges exist. Given that ASF does not pose a direct threat to human health, risk perception

among some of the key actors continues to be low. Communication efforts must highlight the impact of the disease on animal health and welfare, as well as throughout different levels of society, such as farmer livelihoods, food security, countries' economies and international trade.

The impact of ASF goes far beyond the pig sector, since pig farming is intertwined with the global economy. ASF can leave entire families without jobs and threatens the world's supply of pork and other pig products, such as heparin, an anticoagulant for humans with active ingredients derived from pig intestines. Thus, efficient communication is crucial to raise awareness and prompt action to reduce the risk of ASF spread and its impact.

Encouraging a change in risky behaviours

The ASF situation worldwide offers an opportunity to make positive changes and improve farming practices. To achieve this, our communication efforts must highlight the link between the changes in behaviours and practices that we want to achieve in our target audiences and their own value systems. Messages should therefore be targeted and tailored to specific audiences, after listening to and understanding their needs. Additionally, for these communication efforts to be effective and sustainable over the long term, it is vital that policy-makers provide the conditions that make it possible to facilitate change, through national programmes that encourage such change and through legislation.

> Countries and stakeholders are encouraged to use and disseminate the tools of the 'ASF Kills Pigs' campaign

To support countries in driving these changes, the World Organisation for Animal Health (OIE) has developed an awareness campaign that targets different actors involved in the spread of the disease. Hunters, small pig farmers and large commercial pig producers, as well as travellers and the transport industry, are called upon to play an active role in preventing this deadly pig disease and to avoid becoming carriers. Countries and stakeholders are encouraged to use and disseminate the tools of the 'ASF Kills Pigs' campaign to promote the precautions necessary to protect both pigs and the farming economy as a whole.

'ASF Kills Pigs' awareness campaign displayed at a Customs station in Laos. Photo provided by the Veterinary Services of Laos

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OIE portal on African swine fever

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OPINIONS AND STRATEGIES

African swine fever and the World Animal Health Information System

KEYWORDS

#African swine fever (ASF), #OIE-WAHIS.

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African swine fever (ASF) was first described in Kenya, in 1921, and has been subsequently reported in several African countries. Numerous incursions of ASF occurred outside Africa during the 1960s and 1970s, but most of these were eradicated [1]. During the 1990s and 2000s, the disease persisted on the African continent and on the Italian island of Sardinia. In 2007, it occurred again, outside Africa, in the Caucasus region, affecting Georgia, Armenia and Russia in 2007 and Azerbaijan in 2008, and reaching the European Union in 2014. In 2018, the disease spread to the People's Republic of China, and has subsequently spread to other Asian and European countries where it has never previously been reported.

The recent global distribution of the disease during the period from 2016 to 2020 (as of 18 June) is depicted in Figure 1.

Since 2005, ASF has spread across 66 countries on three continents (Africa, Asia and Europe). Specifically, as of June 2020, 32 countries in Africa,[(1)] 20 countries in Europe[(2)] and 14 countries in Asia[(3)] have notified this disease to

the World Organisation for Animal Health (OIE).

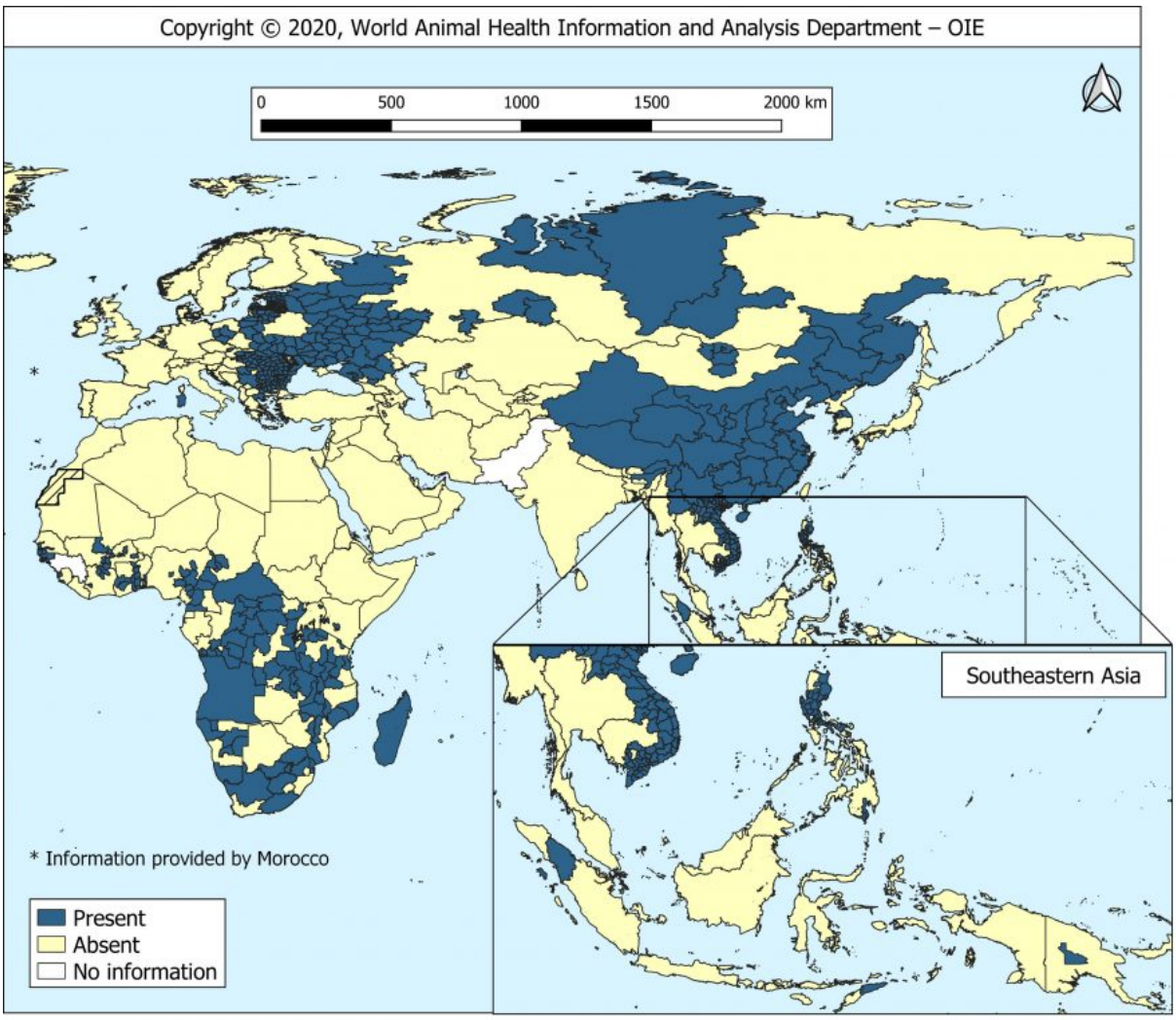

Fig. 1. Global distribution of African swine fever from 2016 to 2020 (as of 18 June)

In this context, the World Animal Health Information System (WAHIS) of the OIE has been essential to centralise, verify and publish information on the occurrence of ASF outbreaks, provided by national Veterinary Authorities, in a timely manner. In 2020,[4] 27% of all the immediate notifications submitted to the OIE were for ASF.

Through WAHIS, the OIE informs the international community on the evolution of the disease situation, through alert messages, weekly follow-up reports, weekly regional epidemiological bulletins for Asia, and fortnightly global epidemiological bulletins. In addition, to ensure transparency in disease reporting, the OIE has established an active search of unofficial information, improving the transparency and timeliness of reporting by countries.

(1) Angola, Benin, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, Congo (Democratic Rep. of), Congo (Rep. of), Côte d'Ivoire, Ethiopia, Gambia, Ghana, Guinea-Bissau, Kenya, Madagascar, Malawi, Mali, Mauritius, Namibia, Nigeria, Rwanda, Senegal,

Sierra Leone, South Africa, Tanzania, Togo, Uganda, Zambia, Zimbabwe. Source: WAHIS, 2020.

(2) Armenia, Azerbaijan, Belarus, Belgium, Bulgaria, Czech Republic, Estonia, Georgia, Greece, Hungary, Italy, Latvia, Lithuania, Moldova, Poland, Romania, Russia, Serbia, Slovakia, Ukraine. Source: WAHIS, 2020.

(3) Cambodia, China (People's Rep. of), Hong Kong (Special Administrative Region of the People's Rep. of China), India, Indonesia, Korea (Dem. People's Rep. of), Korea (Rep. of), Laos, Mongolia, Myanmar, Papua New Guinea, The Philippines, Timor-Leste, Vietnam. Source: WAHIS, 2020.

(4) To 24 June 2020.

http://dx.doi.org/10.20506/bull.2020.1.3118

More information about the OIE World Animal Health Information System (WAHIS)

Access the WAHIS interface

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PERSPECTIVES

OPINIONS AND STRATEGIES

The global economic impact of ASF

KEYWORDS

#African swine fever (ASF), #socio-economic impact.

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Pig meat is a major source of protein in human diets, with a stable share of 35–40% of global meat production, currently representing an annual consumption of more than 110,000 metric tonnes. When African swine fever (ASF) emerged in the People's Republic of China in 2018, major losses were expected. However, the observed losses have eclipsed the estimates made at the onset of the outbreak.

The disease is known for its economic impact on smallholders and emerging commercial farmers. It negatively affects the livelihoods of numerous poor households that depend on pigs as a source of protein and income, as

means to capitalise savings, and as 'safety nets' during times of hardship. Many such farmers have lost or will lose their businesses because of ASF. Simultaneously, market prices have soared: in China, retail prices rose by 78% (month to month) in September 2019, impacting consumers. At the national level, one major consequence of ASF is the loss of status for international trade and the costs of implementing drastic measures to control the disease. In Vietnam, for example, it is estimated that nearly 6 million pigs have been culled since February 2018, representing approximately 20% of the pig population. This is significant in a country where the pig sector was valued at US$ 4.03 billion, nearly 10% of the national agriculture sector.

> African swine fever is expected to have a noticeable worldwide effect on both meat and animal feed markets

Globally, the main economic impact is occuring in China, where annual pork production had grown by more than 50 million tonnes since 2010. Prior to ASF, half of the world's total output of pork was produced in China. By the end of 2019, the Chinese national pig herd had fallen by half, and it is expected that production will continue to fall by 10–15% in 2020, in addition to a 25% reduction in 2019. In September 2019, it was estimated that China alone had experienced direct economic losses of US$ 141 billion. With the emergence of COVID-19, control measures taken by the Chinese authorities, including social distancing, restrictions on transportation, and limitations on people's mobility, have led to additional challenges to business continuity for farmers, particularly those with small- and medium-sized businesses.

As global pig production is threatened, tensions have grown along the supply chain. According to the Food and Agriculture Organization of the United Nations (FAO) Food Outlook dated May 2019 [1], global meat output is expected to decline because of a fall in the pig meat component, primarily in China; this gap will not be compensated for by expansions in bovine, poultry and ovine meat production. Thus, ASF is expected to have a noticeable worldwide effect on both meat and animal feed markets. Accordingly, China's total consumption of animal feeds, such as soy, dropped by 17% in 2019.

> The shortfalls in Asian pork production create challenges, as well as opportunities

The shift in global trade patterns to meet the demand for animal protein remains dynamic. The shortfalls in Chinese and regional pork production create challenges, as well as opportunities for exporters (e.g. Brazil, the European Union and the United States of America) and for suppliers of alternative animal proteins, with the poultry share projected to grow by more than 30% by 2025, at the expense of pork [2]. Nevertheless, although ASF creates opportunities, it may also bring constraints and raise costs throughout the global supply chain.

http://dx.doi.org/10.20506/bull.2020.1.3119

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PERSPECTIVES

OPINIONS AND STRATEGIES

The pig value chain in South-East Asia and challenges to disease management

SUMMARY

There are many challenges confronting pig production and disease control in South-East Asia, including the predominance of smallholder production systems, poor biosecurity practices, and unregulated movements of diseased pigs and their products. Behaviour changes are needed from those in the value chain to ensure that disease management strategies are sustainable.

KEYWORDS

#African swine fever (ASF), #disease control, #pig production, #South-East Asia, #value chain.

AUTHORS

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Pigs play an important role in the livelihoods of rural and peri-urban populations in South-East Asia, and, in most countries, pork is the most preferred meat.

Production systems

Pigs are raised in a variety of settings in South-East Asia, from small family units of scavenging and backyard pigs, to small-to-medium-scale semi-commercial units, and large intensive units. Today, small pig-rearing operations in the back yard with no or limited biosecurity are the predominant practice and the one most vulnerable to disease risks. Pig farming in peri-urban areas is becoming more commercially oriented, and such farms are usually well equipped and managed, with a high level of biosecurity and productivity.

Trade practices

The pig trade is driven by market demand and price differentials. Traditionally, town traders, including slaughterhouse operators and market sellers, come to villages to purchase pigs to supply local demand. Improved road infrastructure has also facilitated long-distance trade from rural producers to big cities and even overseas markets. However, in most areas, pig movements are difficult to monitor, due to the lack of effective tracing systems, and there are many unregulated movements. Furthermore, the current spread of African swine fever (ASF) dramatically affects the price of pigs and pork, leading to changes in trade and movement patterns, both locally and internationally.

Challenges facing disease control

The nature of smallholder pig production and movement patterns in South-East Asia have created obstacles to the successful implementation of disease control strategies. Many pig production areas face a lack of resources for disease control, including a shortage of veterinarians. Ineffective tracing and inspection systems also promote disease spread through the movement of live pigs and pig-derived products. Furthermore, fomites, such as contaminated trucks and animal feed, can play a role. Human behaviour is often the underlying cause of disease spread. Improving awareness of disease prevention and control measures among those involved in the pig value chain and promoting good biosecurity practices are essential in achieving a sustainable approach to protect safe pig production and trade. Multidisciplinary teams, involving veterinarians, animal production professionals, socio-economists, and communication officers are needed to explore how human behaviour can be changed to mitigate disease risk. This is particularly important, given the recent introduction and spread of ASF, which is threatening the entire South-East Asian pig industry.

More information on the pig production system and value chain in South-East Asia

http://dx.doi.org/10.20506/bull.2020.1.3120

PERSPECTIVES

OPINIONS AND STRATEGIES

African swine fever and the dilemma of a relatively low contagiousness

KEYWORDS

#African swine fever (ASF), #diagnosis, #epidemiology, #wild boar.

AUTHORS

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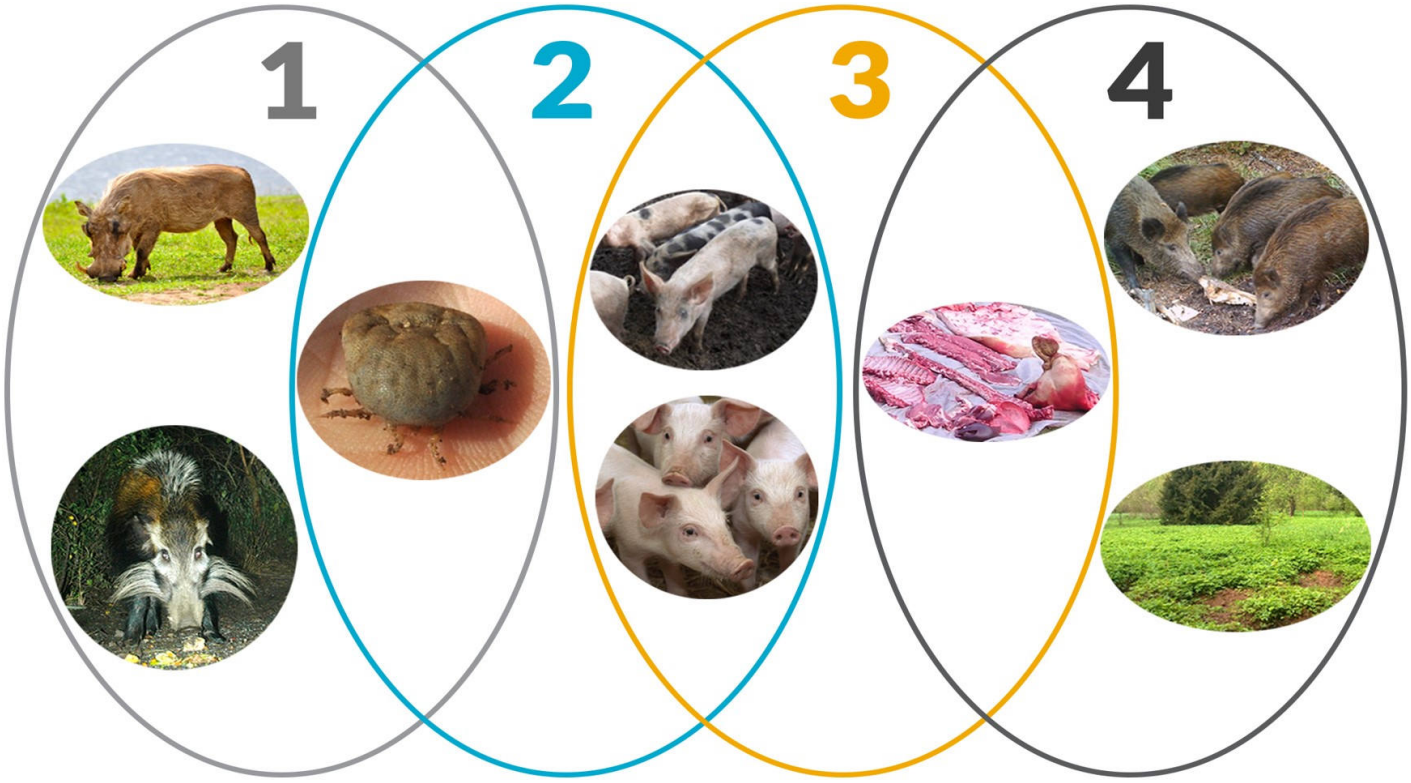
African swine fever (ASF) is a viral disease of domestic and wild pigs, characterised by a high fatality rate and relatively low contagiousness [1]. These qualities lead to a slow spread of the disease within pig populations and the initial low mortality rate makes disease prevention and early detection particularly challenging. In the current ASF epizootic in Europe and Asia, a

separate epidemiological cycle of ASF (Fig. 1) has been described [5], in which virus circulation is maintained within wild boar populations and their habitat.

The anthropogenic factor

Humans are recognised as the main driver of long-distance ASF spread and virus introduction into disease-free populations of domestic and wild pigs. Identifying the anthropogenic or 'human factor' is of enormous importance in understanding the pattern of ASF spread. If we consider only the biological characteristics of the disease (e.g. contagiousness, resistance to inactivation and case fatality rate) and neglect the human aspects, we will be unable to control this epizootic [1].



1) Sylvatic cycle: common warthog (*Phacochoerus africanus*), bushpig (*Potamochoerus larvatus*), and soft ticks of *Ornithodoros* spp. The role of the bushpig in the sylvatic cycle remains unclear.
2) Tick–pig cycle: soft ticks and domestic pigs (*Sus scrofa domesticus*).
3) Domestic cycle: domestic pigs and pig-derived products (pork, blood, fat, lard, bones, bone marrow, hides).
4) Wild boar–habitat cycle: wild boar (*S. scrofa*), pig- and wild boar-derived products and carcasses, and the habitat.

Fig. 1. The four transmission cycles of ASF with the main transmission agents depicted. *Source: [1, 5].*

The early detection dilemma

ASF may go unnoticed until mortality becomes significantly raised several weeks after being introduced into domestic pig and wild boar populations, as observed under field conditions [2, 3]. However, improved passive surveillance, including targeted sampling and testing of dead animals, has been shown to promote early detection of ASF [3]. Paradoxically, effective surveillance that enables early detection of ASF before the occurrence of a large

number of pig deaths, in combination with the rather low contagiousness, creates a dilemma in justifying the drastic culling of all animals. As a result of this dilemma, and building on an improved understanding of ASF epidemiology and biosecurity, partial stamping out has been discussed, and used under specific circumstances. Fit-for-purpose surveillance and control strategies are therefore essential.

Persistence triangle

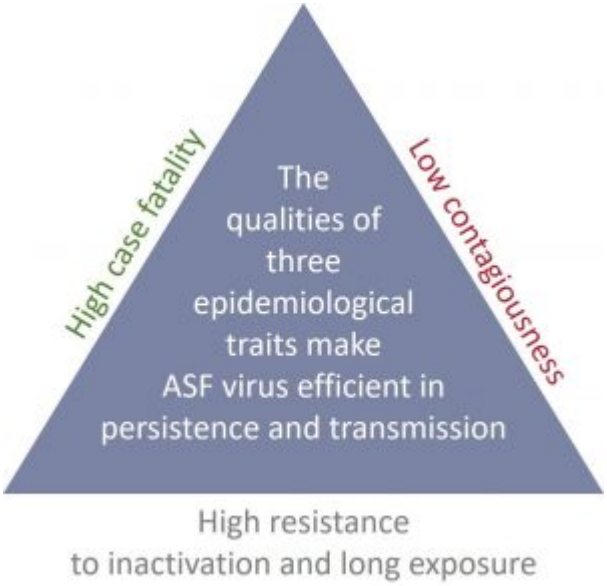


Fig. 2. The persistence triangle

The combination of a high case-fatality rate and resistance to inactivation ensures long-term virus persistence in animal carcasses and the environment; meanwhile, the relatively low contagion rate prevents complete depopulation of the host population (Fig. 2). The interaction of these three parameters maximises both local persistence and constant geographical spread, making the eradication of ASF in natural habitats challenging in the absence of other control tools, e.g. vaccination [1].

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PERSPECTIVES

OPINIONS AND STRATEGIES

Prevention and control measures for ASF

SUMMARY

African swine fever can be transmitted via direct animal contact or through the dissemination of contaminated food or equipment. This disease has serious economic implications for the pig-meat and related sectors, including the indirect costs incurred by trade restrictions. There is no vaccine or cure despite active ongoing research.

KEYWORDS

#African swine fever (ASF), #disease control, #European Commission, #European Union, #international standard.

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At present, no vaccine or cure is available for African swine fever (ASF), despite continuing active research. However, thanks to the risk-based control measures taken by the European Commission since 2014, it has been possible to confine the disease to relatively limited areas in the European Union (EU) and to eradicate ASF from the territory of the Czech Republic, the first country in the world to do so in recent times.

Outside the EU, the ASF epizootic has escalated globally. From its first detection in the People's Republic of China, it has spread very quickly to all of China's provinces, as well as to other countries in Asia.

From the early stages of ASF outbreaks along EU borders, the European Commission has been actively addressing the risk of entry and spread of the disease into the EU, in close coordination with EU Member States.

Measures have been established in EU legislation that are applied wherever ASF is suspected or confirmed, either in holdings or in feral pigs, to prevent the spread of the disease and support its eradication.

The EU applies stringent restrictions on the movement of pigs and pig products in affected areas, in accordance with the 'regionalisation' approach. These risk-based restrictions are continuously being updated, in line with the geographical occurrence of the disease. This approach allows the EU to maintain trade in both the international and internal market and has been recognised by certain trading partners.

This EU legislation is fully in accord with the World Organisation for Animal Health (OIE) international standards.

The comprehensive EU control measures also include:

- stamping-out of pig populations in affected holdings
- intervention from the experts of the EU Veterinary Emergency Team in affected countries
- scientific advice from the European Food Safety Authority
- efficient diagnostic capabilities and technical expertise driven by the EU Reference Laboratory for ASF
- research on candidate vaccines
- audits to verify the correct enforcement of EU legislation
- financial support (more than EUR 100 million have already been spent between 2013 and 2019 to prevent, control and eradicate ASF)
- public awareness campaigns
- official checks of personal consignments at borders
- international cooperation.

The European Commission is aware that, to combat ASF, a long-term global strategy and considerable resources – both human and financial – are required. Cooperation, commitment, transparent communication, shared experiences and the use of best practices for preparedness, prevention and control are needed by all parties to reduce the impact of ASF and contribute to the sustainability of pig farming and national and international trade, by limiting the global consequences of ASF.

The European Commission supports the establishment of a global initiative to control – and, it is hoped, eradicate – ASF, as agreed during the last General Session of the World Assembly of Delegates of the OIE (Paris, May 2019) [1].

Portal of the European Commission on African swine fever

http://dx.doi.org/10.20506/bull.2020.1.3122

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DOSSIER

Vaccines for ASF

Current situation and perspectives

KEYWORDS

#African swine fever (ASF), #African swine fever virus (ASFV), #vaccination, #vaccine.

AUTHORS

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No commercial vaccine is available for African swine fever virus (ASFV), which limits control options. This is due to the complexity of the virus DNA genome, which encodes up to 165 proteins and packages about 70 in the multi-layered virus particle.

Inactivated virus preparations have failed to induce protection in pigs against challenge. In contrast, live attenuated vaccine (LAV) candidates can induce high levels of protection. LAVs can be produced by passage of virus in cell culture or by targeted gene deletions, or they may be isolated from the field. Increasing numbers of full genome sequences and understanding of viral gene functions have established that deletion of genes that inhibit the main host antiviral pathway (the type I interferon response) can attenuate virulent virus and induce protection.

> Several promising live attenuated vaccine candidates have been identified

Several promising LAV candidates have been identified. These should meet preliminary safety and efficacy standards prior to their scale up and further larger-scale testing. A cell line needs to be identified for this scale up. Required safety criteria include limited clinical signs and virus replication after immunisation and challenge over a defined dose range, and following repetition and overdosing. Efficacy should enable the predicted herd immunity threshold to be achieved. Vaccination of both domestic and wild pigs against ASFV will be needed. Therefore, vaccines should be effective when delivered intramuscularly or orally in baits to wild pigs.

> Further research may enable the development of vaccines with an improved safety profile compared with live attenuated vaccines

Protective immune responses and antigens that induce these are poorly characterised. Cellular CD8+ responses are required for protection, but the cell subsets involved have not been described. Transfer of serum from immune to naïve animals induces partial protection. Some targets for neutralising antibodies have been reported, although these are not fully effective. Pools of antigens that induce some protective responses have been identified. Further research may discover an antigen combination and delivery method that induces good efficacy. This could enable the development of vaccines with an improved safety profile compared with LAVs. Vaccines designed with capability to distinguish infected from vaccinated animals would, in the longer term, aid monitoring of vaccination campaigns and establishment of freedom from disease.

http://dx.doi.org/10.20506/bull.2020.1.3123

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DOSSIER

Euroasiatic wild pigs and ASF virus genotype II: a new challenge

SUMMARY

The presence of African swine fever (ASF) virus in wild pigs represents a challenge for any Veterinary Service, as a multisectoral approach is essential for successful disease management. The human contribution to disease spread is one of the most important factors to consider when dealing with ASF in wild pigs.

KEYWORDS

#African swine fever (ASF), #epidemiology, #hunting, #wild boar, #wildlife.

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The presence of African swine fever (ASF) virus in wild pigs represents a challenge for any Veterinary Service, as a multisectoral approach is essential for successful disease management.

The human contribution to disease spread is one of the most important factors to consider when dealing with ASF in wild pigs. Once ASF virus is introduced into the wild pig population, an epidemic wave – determined by direct transmission – is usually observed. The epidemic then develops into an endemic state, during which contact between infectious carcasses and susceptible wild pigs (indirect transmission) is the main mechanism by which infection is maintained in the local wild pig population [2].

The three strategic pillars for disease management are:

(1) Early detection: the prompt detection of virus ensures that its geographical spread remains limited; smaller areas are easier to manage. The virus can only be detected by passive surveillance in a previously free wild pig population or area. Testing dead wild pigs in at-risk areas is therefore critical for early detection.

(2) Addressed management of the infected population: the different management options (i.e. depopulation, sit and wait, fencing) should be evaluated in view of the ecology and demographics of the infected wild pig population. Evidence suggests that immediate depopulation of infected wild pigs is counterproductive, because it enhances escape behaviours (causing the geographical spread of the virus), and efficient hunting is rarely achieved by hobby hunters. Fences may be useful if integrated into a complex eradication programme that includes different interventions for the different epidemiological phases of the disease [2].

(3) Virus contamination of the environment: ASF virus remains active in the carcass long after the death of the host, thus contaminating the environment. Decontamination of the environment is therefore the final goal of any eradication programme in wild pig populations. Biosecurity measures applied during hunting, and safe disposal of wild pig carcasses, play a pivotal role in preventing the local persistence of the virus and further anthropogenic spread into disease-free areas [2].

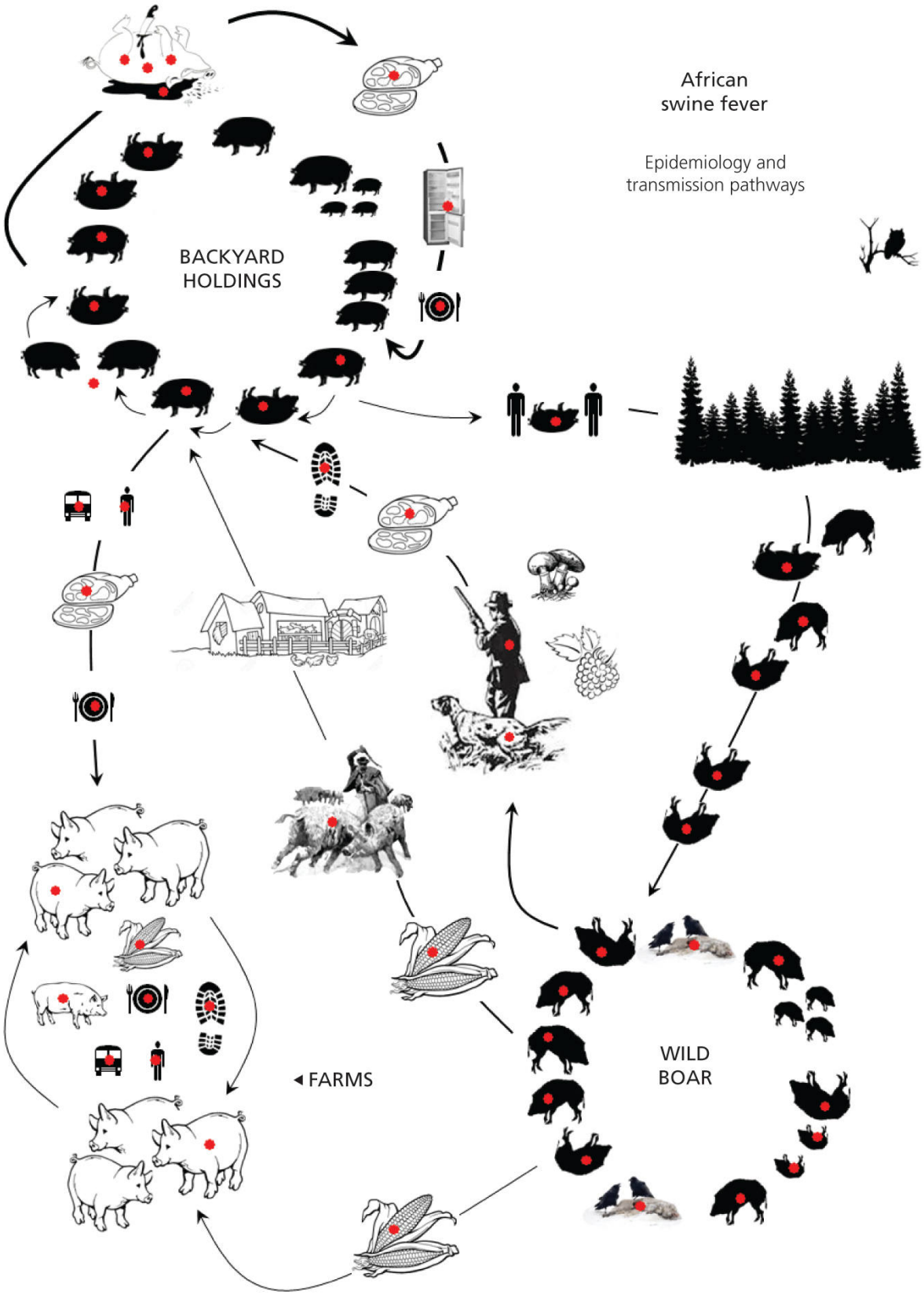
African
swine fever
Epidemiology and
transmission pathways
BACKYARD
HOLDINGS
FARMS
WILD
BOAR

Fig. 1. The ecological complexity of African swine fever. *Source: African swine fever in wild boar: ecology and biosecurity [2]*

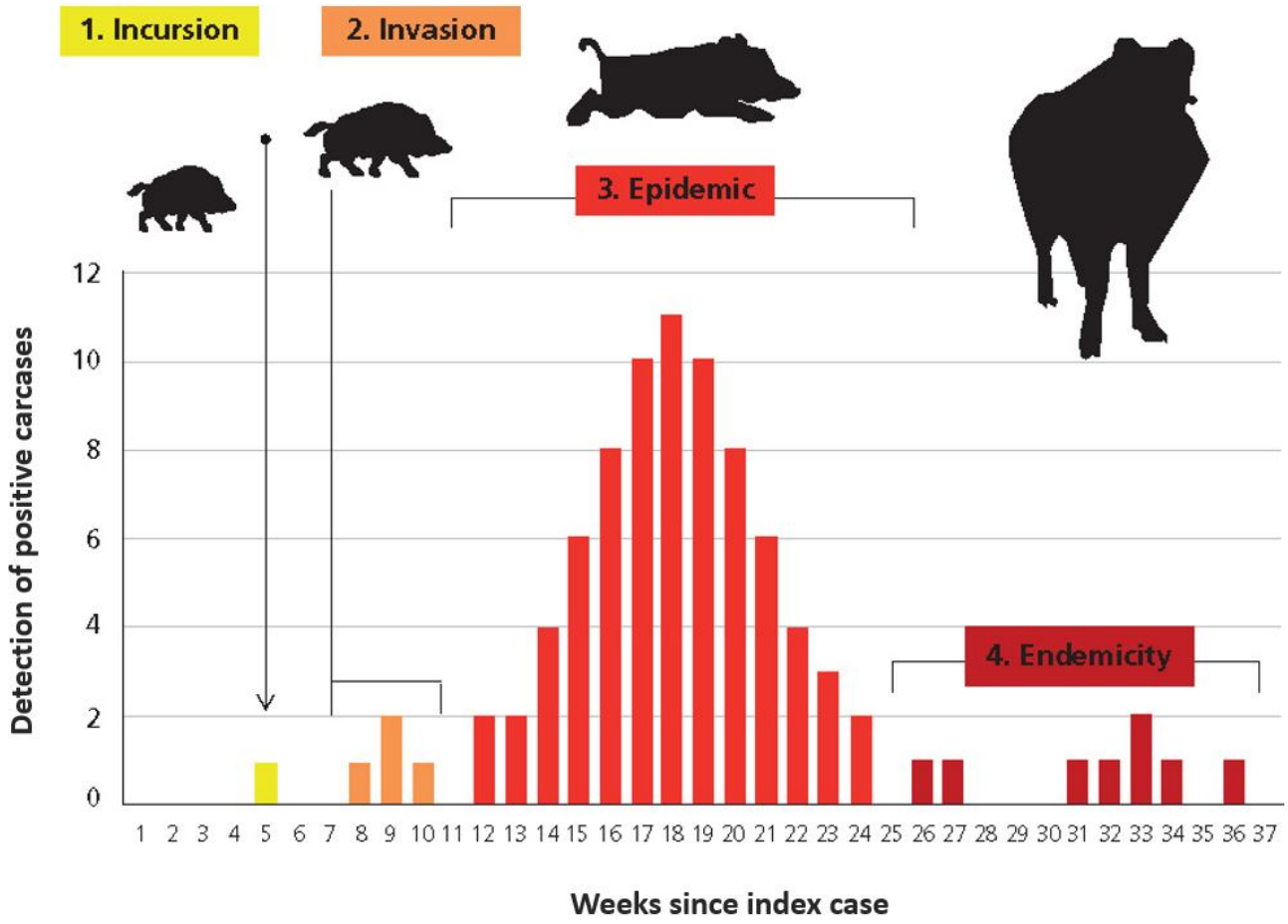

Fig. 2. The different phases of African swine fever infection in wild pig populations. *Source: African swine fever in wild boar: ecology and biosecurity [2]*

http://dx.doi.org/10.20506/bull.2020.1.3124

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DOSSIER

Epidemic situation and practices for ASF in China

KEYWORDS

#African swine fever (ASF), #China (People's Rep. of), #disease control.

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By 31 December 2019, 162 outbreaks of African swine fever (ASF) had been reported in 31 provinces and in the areas under the jurisdiction of the Xinjiang Production and Construction Corps[(1)] (Fig. 1). These outbreaks killed 13,827 of 20,528 infected pigs, and more than 1.1 million pigs have been stamped out. The causative strain belonged to genotype II. The majority of outbreaks (73.4%) occurred in small- and mid-sized farms. As at April 2019, almost all of the reported outbreaks occurred in small- and mid-sized farms (91.4%).

Transmission routes

An analysis of the hypothesised means of introduction for 148 outbreaks in farms and slaughterhouses indicates that the main transmission routes included contact through vehicles and personnel (42%), swill feeding (39%), and movement of infected pigs and risky pig products (19%). The first outbreak reported in 14 provinces was associated with swill feeding. In addition, nine outbreaks occurred in vehicles transporting pigs, and five outbreaks were reported in wild pigs.

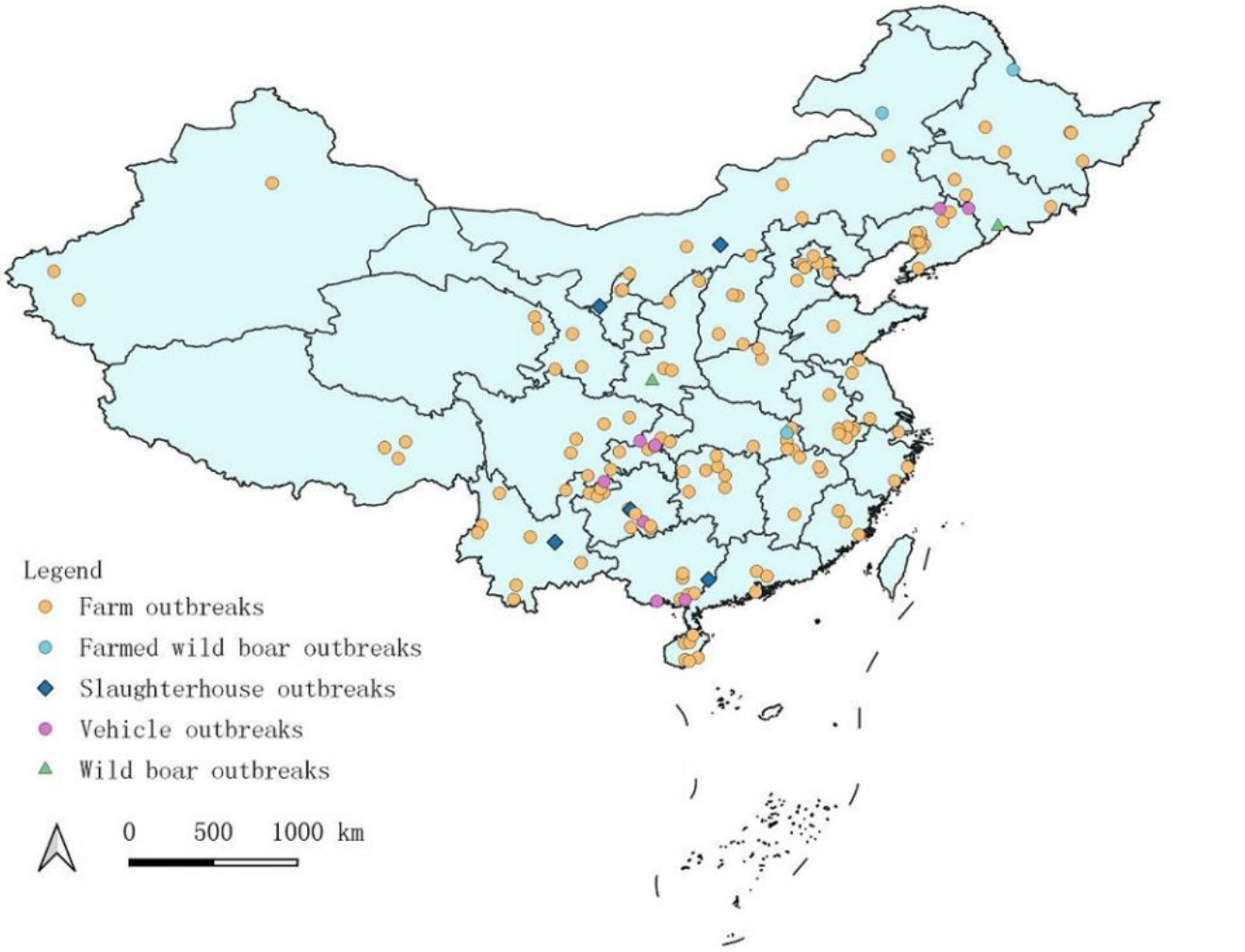

Fig. 1. Spatial distribution of African swine fever outbreaks in mainland China. Source: Ministry of Agriculture and Rural Affairs of the People's Republic of China.

Launch of targeted polices

Prevention and control policies were adjusted, based on the epidemic characteristics. These policies included ban on swill feeding, movement control, closing live pig markets, strengthening inspection at slaughterhouses, vehicle cleaning and disinfection, and improving farm-level biosecurity. According to a survey for the pig industry launched in November 2019, the overall implementation rate of prevention and control measures among respondents was

90%, and swill feeding almost disappeared. The awareness of prevention and control measures carried out by local governments, veterinary authorities and farmers has greatly improved over time. In addition, the proportion of positive samples collected from vehicles, slaughterhouses and markets has dramatically decreased. With the implementation of these measures, the severity of the epidemic has moderated (Fig. 2).

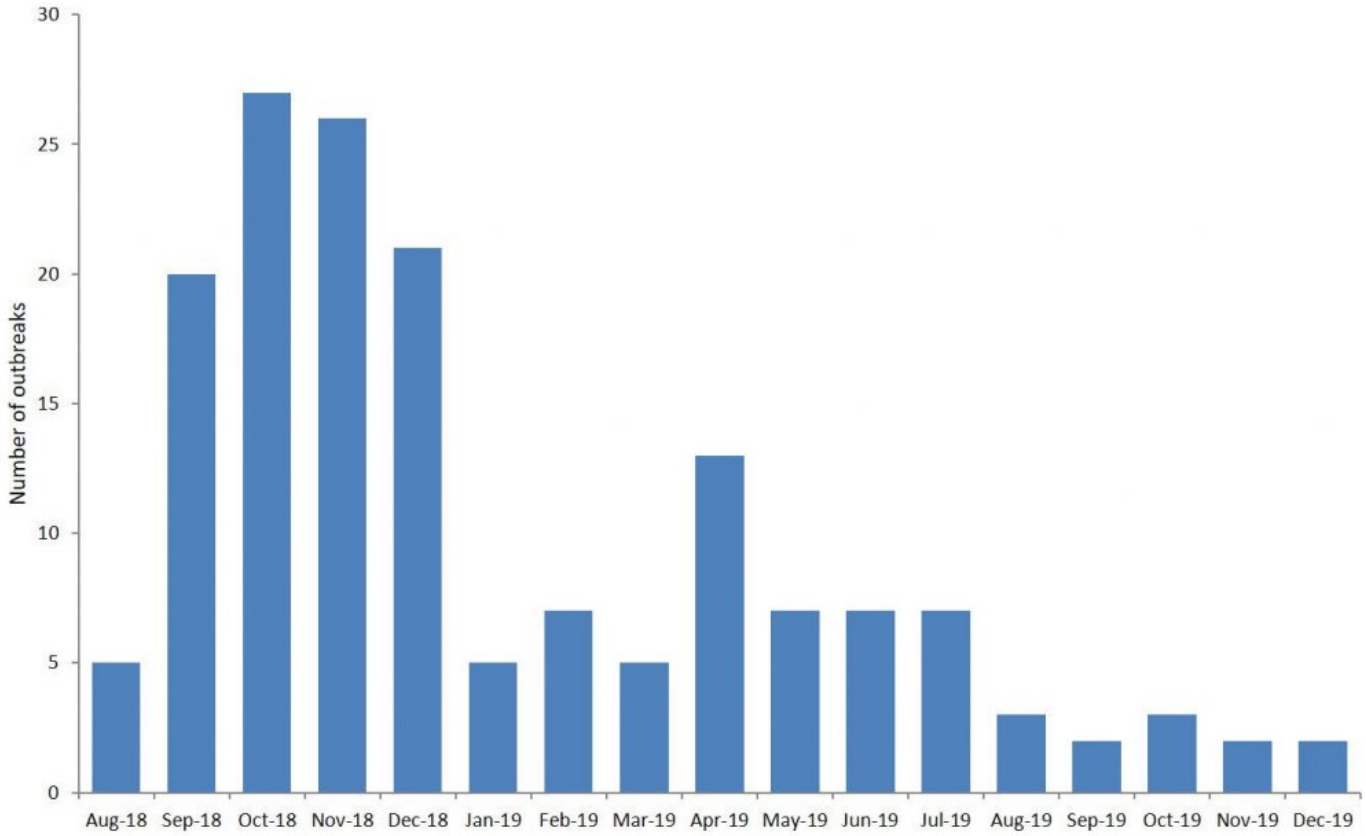

Fig. 2. Temporal distribution of African swine fever outbreaks in mainland China. Source: Ministry of Agriculture and Rural Affairs of the People's Republic of China.

(1) The Xinjiang Production and Construction Corps is an administrative authority in the Xinjiang Uyghur Autonomous Region of China.

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DOSSIER

African swine fever – getting prepared

KEYWORDS

#African swine fever (ASF), #emergency preparedness, #stamping out.

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The three key components of a 'stamping-out' strategy that are most commonly implemented to control an outbreak of African swine fever (ASF) are: destruction, disposal and decontamination (a process that includes disinfection), otherwise known as 'the 3Ds' [1, 2]. All three present significant logistical and environmental challenges. Therefore, preparedness planning is essential to ensure success.

The contagiousness of the ASF virus (ASFV) and the intensive nature of pig farming generally mean that, in an outbreak, large numbers of animals may need to be culled in a short period of time. The effective *and humane* killing of pigs is particularly challenging. The welfare of both the animals and the people undertaking the killing is

important; therefore, ensuring in advance that skilled people are available for this task is crucial.

A number of acceptable killing methods are described in the OIE standards, and more than one will be needed, depending on the size and age of the pigs, the availability of equipment, and the facilities. The psychological impacts of destroying large numbers of animals, both on the people who work with the animals and those involved in the destruction process, can be significant, and must be monitored.

The effective disposal of very large numbers of pigs and infective material presents environmental and logistical problems. Methods include burial, incineration or rendering. Burial is the most frequently used method, but there are many environmental constraints, including the risk of leaching into groundwater. Rigorous pre-identification of suitable burial sites and attention to design are essential. The hardy nature of the virus means that sites must be scavenger-proof, particularly where feral pigs are present.

> Transport used to convey carcasses and other infective material to disposal sites must be biosecure

The effective decontamination of farms and disinfection of risk material are critical to prevent further exposure. This includes decontamination and disinfection of fomites, such as housing, equipment and vehicles, and the clothes of people who may have come into contact with infected animals or those suspected to be infected (suspects). Only disinfectants that inactivate ASFV should be used, and this must be done in accordance with the instructions on the label. All organic material must be removed and safely disposed of during decontamination. Decontamination may also include the elimination of vectors, as appropriate.

Three OIE *Terrestrial Animal Health Code* chapters provide guidance on the 3Ds [3, 4, 5].

A number of organisations and countries have posted ASF response plans online, and these are useful resources for readiness planning [2, 6, 7, 8, 9, 10].

http://dx.doi.org/10.20506/bull.2020.1.3126

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DOSSIER

Border control measures to prevent the introduction of ASF

Lessons from the Japanese experience

KEYWORDS

#African swine fever (ASF), #border control, #communication, #Japan, #quarantine, #risk, #transboundary animal disease.

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Control measures are required both before departure and on arrival to effectively prevent the transmission of African swine fever (ASF) across borders. Collaboration with the relevant organisations is paramount to deliver the message to international travellers to neither bring in nor take out any prohibited animal products, and also to implement strict border control

measures at the port of entry.

The transmission of viruses, including ASF virus (ASFV), is often mediated by humans, and one of the major pathways of the global spread of ASF is the international movement of people and goods. As of 26 December 2019, the Animal Quarantine Service (AQS) of Japan had detected 86 pork products that tested positive for ASFV by polymerase chain reaction (PCR) in passenger luggage from ASF-affected countries, and live virus was isolated from two of these. This demonstrates the extremely high risk of ASF incursion by such pathways into ASF-free countries (including Japan), and the urgent need for strict border control measures.

Measures are required both before departure and on arrival to effectively prevent the introduction of ASF. To achieve this, concerted efforts and close collaboration between public- and private-sector stakeholders is of the utmost importance.

Collaboration with relevant organisations for effective risk communication

Collaboration with relevant organisations is key to reaching various types of international travellers, to urge them to neither bring in, nor take out, any prohibited items on arrival or departure. Embassies, airlines and travel agencies have good access to international travellers. Japan has requested airlines to make an in-flight announcement and show posters at check-in counters. Collaboration is also taking place with relevant organisations to inform foreign workers and international students coming to Japan. Foreign postal services have been notified through the Universal Postal Union.

Border control measures at the port of entry

To implement border control measures on arrival, Japan has increased the number of detector dogs and animal quarantine officers to detect the illegal entry of animal products. With the close cooperation of the Customs Office, the livestock products declaration form has been revised to increase the visibility of prohibited animal products that require a passenger declaration. In addition, penalties for the illegal transport of prohibited animal products are now more stringently enforced, especially for malicious or repeated cases.

More information is available from the website of the Animal Quarantine Service of Japan (AQS)

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DOSSIER

The role of ticks in the transmission and maintenance of ASF

KEYWORDS

#African swine fever (ASF), #epidemiology, #tick.

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African swine fever (ASF) is believed to have evolved in eastern and southern Africa in a sylvatic cycle between common warthogs (Phacochoerus africanus) and argasid ticks of the Ornithodoros genus. In Africa, soft ticks of the O. moubata group are considered to be the main vectors and reservoirs for ASF virus (ASFV), but other species have also been shown to be competent vectors of the virus.

During the re-emergence of ASF in Portugal in the 1990s, native soft tick *O. erraticus* was identified as a natural reservoir of ASFV, allowing the long-term persistence of ASFV and complicating its eventual eradication. Experimental infection of various other tick species suggests that more ticks could potentially become biological vectors of ASFV. Several tick species found in either Central or North America (*O. coriaceus*, *O. turicata*, *O. parkeri*, and *O. puertoricensis*, *O. savignyi*) are known to support ASFV replication.

> ASF appears to be persisting among wild and domestic pig populations in the absence of soft tick vectors

Although transmission in domestic pigs occurs predominantly by direct contact, or indirectly through the consumption of infected meat products, the involvement of argasid ticks in the maintenance of the disease has historically been a common criterion for the establishment of endemicity. However, the relevance of ticks in the contemporary epidemiology of ASF could be questioned, as the maintenance of ASFV in domestic pigs (largely or entirely in the absence of a sylvatic cycle) is known to occur in more than half of the countries currently affected by the disease, even in areas where the disease is endemic. In contrast to the African situation, the current spread of ASF across Europe and Asia appears to be persisting among wild and domestic pig populations in the absence of soft tick vectors. Although *O. erraticus* is largely confined to Mediterranean countries, other *Ornithodoros* species are known to occur in areas recently affected by ASF. These include *O. alactagalis*, *O. asperus*, *O. coniceps*, *O. lahorensis*, *O. tholozani* and *O. verrucosus*. The possibility exists that these species may contribute to the long-term maintenance of ASFV in those territories. Recent studies exploring the ability of Palearctic ticks to maintain and transmit ASFV showed that *O. verrucosus* were able to maintain the virulent Eurasian ASFV strains for several months, but could not transmit the virus to naïve pigs. This suggests that this species is unlikely to contribute significantly to the persistence of the disease in the region. Despite recent advances, many questions remain to be answered about the ability of the New World *Ornithodoros* ticks to transmit ASFV.

Information on the ability of diverse species to support the replication of the virus, potential transmission rates and duration of infections would greatly increase the ability to predict the threat posed by a given species of tick. The application of Next-Generation Sequencing will enable further research into viral adaptation to different species of ticks and the influence that different strains of ASFV may have on the ability of these tick to maintain the disease. Developing a more comprehensive framework of research on the role ticks may play in the dissemination and maintenance of the disease will contribute significantly to combating this complex disease.

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DOSSIER

Compartmentalisation to facilitate pork production in high-risk environments for ASF

KEYWORDS

#African swine fever (ASF), #biosecurity, #compartmentalisation.

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Substantially enhanced biosecurity along the pork value chain is currently the only effective way to prevent the introduction of African swine fever virus (ASFV). Compartmentalisation provides pork industry businesses that have the necessary means and motivation with the opportunity to safeguard their pork production, and benefit economically.

Background

The local and long-distance spread of ASFV is strongly influenced by pig and pig-farm density, as well as human

behaviour associated with biosecurity along the pork value chain [1]. There are, at present, no control tools at the regional or national level that can reliably stop the spread of ASFV, once it has been introduced into countries that have a high percentage of small-to-medium-sized pork producers with typically poor biosecurity. These smaller producers with weak biosecurity are often linked into highly complex pork-value chains. It is therefore necessary to define risk management approaches that continue to allow pork production by businesses that are capable of implementing the high biosecurity standards required to control ASFV. This will allow the continuation as well as the recovery of pork supply.

Compartments versus zones or regions

Compartmentalisation usually focuses on single or multiple connected business entities with pork production facilities that (in epidemiological terms) are effectively isolated from the presence of ASFV in their geographical neighbourhood, through their management and husbandry practices [2]. In contrast, zoning or regionalisation requires that all pork production businesses within a particular geographical area, often bounded by mountains or a river, must operate at the same high biosecurity standard, and cannot have parts of their business outside the disease-free zone or region [2].

Rationale for compartments

A compartment needs an epidemiologically sound risk management and biosecurity plan, and has to involve government veterinary authorities as an accrediting and auditing partner [3]. The considerable investment required for compartmentalisation should be justified by its economic benefits. These include the ability to move and trade animals or animal products between countries, or between regions within countries, as well as the ability to recover rapidly after an outbreak within the compartment.

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DOSSIER

Management options to mitigate the risk of swill feeding

KEYWORDS

#African swine fever (ASF), #feeding, #risk.

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Small-scale pig production offers a way out of poverty in developing countries, and swill feeding is often the most affordable option and therefore widespread. Unfortunately, it poses a high risk for transmission of African swine fever (ASF). Prohibition rarely succeeds in such settings, so alternatives are required to make swill feeding safe.

Introduction

Feeding catering waste as swill is an affordable option for millions of smallholders who raise pigs to improve their household income. Unfortunately, swill derived from leftover food that may contain insufficiently cooked pork poses

a risk of both classical and African swine fever, as both viruses can persist for long periods in chilled or frozen pork [1, 2, 3, 4].

Are bans on swill the only option?

Bans need to be reinforced by inspection, but day-to-day practices in numerous smallholdings cannot be adequately monitored, and therefore bans result in – at best – a false sense of security. Furthermore, while effective risk communication is essential for all approaches, it should focus on the severe consequences of the disease, rather than possible punitive measures, to encourage informed cooperation from pig owners.

Taking a more constructive and practical approach

Licensing safe food waste products, such as vegetables, is a useful approach but excludes meat. It has been pointed out that vast amounts of waste food discarded by retail outlets and households could be processed into nutritious and safe food for pigs [5, 6, 7, 8, 9], and Japan has made considerable advances in this respect [10, 11]. For large-scale production, industrial-scale factories could be licensed to process waste food, by methods known to inactivate pathogens of concern, into dry pelleted or liquid feeds that would be more affordable than grain-based commercial rations [8]. Alternatively, supported by effective risk communication, food waste could be processed at a cottage-industry or household level to enable its safe use in rural areas or areas of low pig density.

Table I. Approaches to preventing the introduction of diseases through swill feeding

Management approach	Advantages	Disadvantages
• Ban on feeding swill by law	• Internationally accepted approach	• Adequate implementation virtually impossible
• Licensing of identified safe ingredients for swill feeding	• Enables affordable safe feeds that do not contain meat	• Potentially nutritious table waste is excluded
• Processing to inactivate the relevant pathogens	• Ensures safety of swill fed to pigs • Reduces food wastage	• Requires investment of time and money

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AROUND THE WORLD

NETWORK INITIATIVES

Establishment of an ASF Reference Laboratories Network

KEYWORDS

#African swine fever (ASF), #OIE Reference Laboratory.

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In February 2019, the OIE Biological Standards Commission identified African swine fever (ASF) as a priority disease of current global importance, for which a network of OIE Reference Laboratories could be established.

The main objective of this ASF Reference Laboratories Network will be to foster strong partnerships among OIE Reference Laboratories, national reference laboratories and experts from laboratories in low- and middle-income countries.

By combining forces, the Network will support initiatives to curb the spread of the disease and assist OIE Members

in controlling ASF and working towards its eradication in affected regions.

OIE Biological Standards Commission

AROUND THE WORLD

NETWORK INITIATIVES

Global African Swine Fever Research Alliance (GARA)

‘Fighting African Swine Fever Together’

SUMMARY

The Global African Swine Fever Research Alliance’s mission is to establish and sustain global research partnerships that will generate scientific knowledge and tools to contribute to the successful prevention and control of African swine fever.

KEYWORDS

#African swine fever (ASF), #Global African Swine Fever Research Alliance (GARA).

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Although African swine fever (ASF) has historically been confined to the continent of Africa, the risk of introductions into ASF-free countries has never been greater. ASF has now spread to more than 21 countries since the first report of an outbreak in the Caucausus region in 2007, reaching the People's Republic of China in 2018. The situation in ASF-infected countries has not improved, increasing the risk that ASF will continue to spread to other countries, resulting in devastating economic impacts on farmers worldwide. Clearly, there is a need for additional scientific information and tools to control ASF.

The Global African Swine Fever Research Alliance (GARA) was launched in April 2013, at the Plum Island Animal Disease Center, in response to the continued threat posed by ASF to pig farmers worldwide. The aim of GARA is to establish and sustain global research partnerships that will generate scientific knowledge and tools to contribute to the successful prevention, control, and, where feasible, eradication of ASF. This objective can be achieved through six strategic goals:

- Goal 1. Identify research opportunities and facilitate collaborations within the Alliance
- Goal 2. Conduct strategic and multidisciplinary research to better understand ASF
- Goal 3. Determine the social and economic drivers and impacts of ASF
- Goal 4. Develop novel and improved tools to support the prevention and control of ASF
- Goal 5. Determine the impact of ASF prevention and control tools
- Goal 6. Serve as a communication and technology-sharing gateway for the global ASF research community and stakeholders.

1st GARA Scientific Conference, Plum Island Animal Disease Center, Orient Point, New York, United States of America, 6-8 April 2013

Today, GARA consists of 38 partner research institutions working together to fight the threat of ASF. The Alliance maintains the GARA website to facilitate communication and provide technical information. One of GARA's most important initiatives is the series of biennial ASF Gap Analysis workshops it organises; for example, an ASF Gap Analysis Workshop in Sardinia, Italy, April 2018.

4th GARA Scientific Conference, Istituto Zooprofilattico Sperimentale, Cagliari, Sardinia, Italy, 11–13 April 2018

The report from this workshop was instrumental in setting the research agenda and activities of the Alliance. Importantly, this report also provides information on the gaps in the scientific information and tools available for controlling ASF, as well as a list of research priorities for addressing those gaps. This information is critical in guiding stakeholders and funding agencies, and in the establishment of strategic research collaborations within GARA. Examples of important stakeholders who are supporting the work of GARA include the International Research Consortium on Animal Health (STAR–IDAZ IRC) and the International Development Research Centre (IDRC).

As ASF continues to spread around the world we must not forget that the origin of this devastating animal disease is Africa, where the ASF virus continues to evolve in complex ecological settings. Today, the focus seems to be primarily on the Georgia 2007 ASF virus strain, which is still spreading across Asia. However, could another strain with different characteristics once again escape from Africa? This will be a key topic at the next GARA scientific meeting in Kampala, Uganda, 25–27 August 2020.

GARA website

AROUND THE WORLD

NETWORK INITIATIVES

Raising traveller awareness about the risk of spreading ASF through air travel

KEYWORDS

#African swine fever (ASF), #aircraft, #communication.

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The International Air Transport Association (IATA) – the trade body for over 290 airlines – and the World Organisation for Animal Health (OIE) have been working together for more than ten years, and reap mutual benefits from this partnership.

Within the framework of this collaboration, IATA has supported the OIE's efforts to raise awareness of the risk of dissemination of African swine fever by air passengers. Through IATA's regional offices in North Asia and Asia–Pacific, a joint communication campaign was launched to coincide with the Chinese New Year holiday period

(from 20 January to 20 February 2020).

AROUND THE WORLD

NETWORK INITIATIVES

The International Council for Game and Wildlife Conservation – at the forefront of surveillance for ASF

KEYWORDS

#African swine fever (ASF), #cooperation, #hunting, #International Council for Game and Wildlife Conservation (CIC), #surveillance, #wild boar, #World Organisation for Animal Health (OIE).

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The International Council for Game and Wildlife Conservation (CIC) is working with members and partners, including the World Organisation for Animal Health (OIE), to respond to and actively minimise the risk of outbreaks of African swine fever (ASF) among wild pigs, and so minimise the spread of the virus to domestic pigs.

Recent activities

The CIC has been closely following ASF developments since 2012. Most recently, the CIC was involved in the establishment of an African Swine Fever Task Force in 2018 following the outbreak in Belgium. The Task Force, composed of hunting organisations and experts, played a crucial role in persuading the Belgian government to take the necessary steps to attempt to contain the virus.

Joint CIC–OIE activities

The OIE and CIC organised a joint international meeting in Paris, France, in 2014 on the early detection and prevention of ASF. In 2017, the CIC, together with the OIE and other partners, organised a training course on the surveillance of wildlife diseases and the role of hunters in Pravets, Bulgaria, with a special focus on ASF.

Future action

The CIC remains committed to working with the OIE and others in containing and minimising the spread of ASF, with the active involvement of hunters.

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AROUND THE WORLD

SUCCESS STORIES

Lessons learned from successful eradication of ASF in the Czech Republic

KEYWORDS

#African swine fever (ASF), #Czech Republic, #eradication, #hunting, #self-declaration, #wild boar.

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The Czech Republic is one of the few countries that has successfully eradicated African swine fever (ASF) within its territory. Early surveillance, strict veterinary measures and biosecurity, and

a coordinated approach played key roles in the successful eradication of the disease.

The first occurrence of ASF was detected in two dead wild pigs in June 2017. The last ASF-positive cases were detected in February 2018 in hunted wild pigs, and in April 2018 in wild pigs found dead. All positive cases were detected in a small area (89 km²) in the Zlín District. There was no outbreak of ASF in domestic pigs.

The following is a brief overview of key control measures used for the successful eradication of ASF.

Early detection and surveillance

It is most important to have early detection of the presence of ASF virus based on passive surveillance in dead wild pigs, and ongoing intensive monitoring.

Zoning

The infected area was defined in compliance with the European Union legislation [1]. At the same time, the area with intensive hunting was determined. The infected area was divided into two parts: a) the high-risk zone (with positive findings), and b) the low-risk zone (Fig. 1).

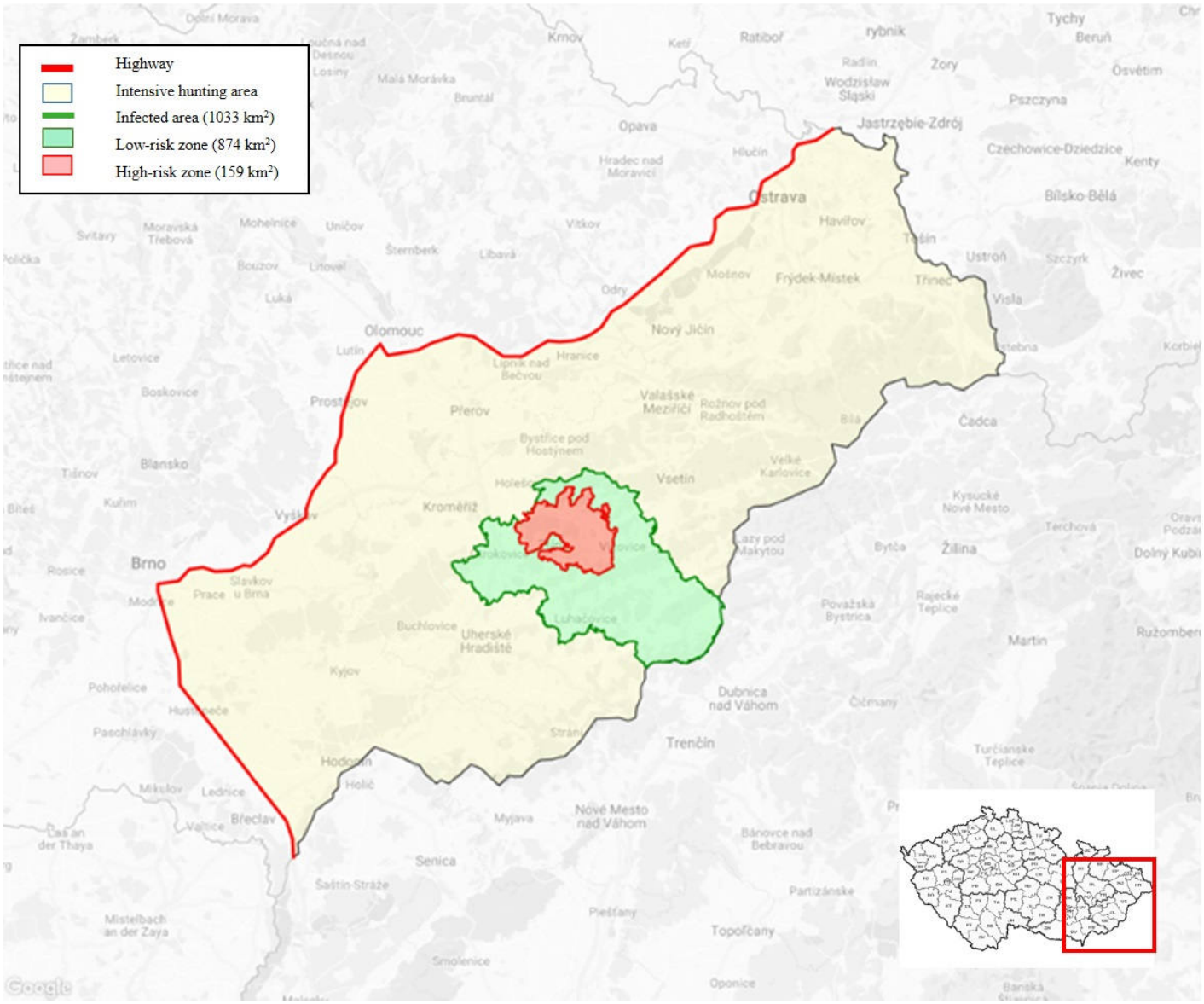

Fig. 1. Map of zones established within the Czech Republic. © Státní veterinární správa

Intensive search for wild pig carcasses

Carcasses of infected wild pigs constitute the greatest risk for the spread of ASF in wild pig populations and this is why an intensive search for wild pig carcasses was implemented in the infected area (Fig. 2). These carcasses were collected while observing strict biosecurity and were transported to a rendering plant.

Fig. 2. Straw contaminated by carcass of dead wild pig. © Státní veterinární správa

Preventing the migration of infected wild pigs

Hunting and feeding of wild pigs were strictly prohibited in the infected area. Some unharvested crops were left in the high-risk zone. Odour and electric fences were installed on the outer periphery of the high-risk zone, and a ban on entering this zone without permission was implemented.

Reduction of the population of wild pigs

After evaluation of the surveillance results, individual hunting in the infected area was allowed for approved hunters trained in biosecurity rules. At the end of the epidemic phase of the infection, police snipers helped to reduce the number of wild pigs in the high-risk zone.

Prevention of introduction to domestic pigs

The measures imposed included a ban on all movements of domestic pigs and products, official inspections of all pig farms targeted on biosecurity, and a wide public information campaign.

♦ More information about our experience is available in published texts [2, 3].

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AROUND THE WORLD

SUCCESS STORIES

The last mile in the eradication of ASF in Sardinia

SUMMARY

African swine fever (ASF) has been endemic in the island of Sardinia, Italy, since 1978. A new disease control strategy implemented in the last few years has been very effective, and final ASF virus eradication appears very close.

KEYWORDS

#African swine fever (ASF), #eradication, #Italy, #pig production, #risk analysis, #wild boar.

AUTHORS

Alberto Laddomada, Direttore Generale, Istituto Zooprofilattico Sperimentale della Sardegna, Sassari, Italy.

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African swine fever (ASF), caused by ASF virus (ASFV) of genotype I, found ideal conditions for endemicity on Sardinia in the free-ranging pigs kept in the inner, mountainous areas of the island, where these pigs live in close contact with wild boar [1].

Until recently, any attempt to eradicate the disease encountered strong resistance from local farmers, who considered this traditional way of keeping pigs as part of their cultural identity. Despite free-ranging pigs posing a constant threat to domestic pigs, preventing disease on high-biosecurity farms has almost always been successful, but this task has been much more difficult on backyard farms [2].

The new programme

In 2015, a new ASF eradication strategy (*EP-ASF-15-18*) was implemented under the authority of the 'Project Unit', a body that was fully empowered by the Regional Government and comprised the heads of several branches and bodies of the regional administration, alongside national, regional and local Veterinary Services and experts. Based to a large extent on conventional veterinary measures adapted to the local situation, the new strategy favoured financial incentives for good husbandry practices and biosecurity over compensation to affected farmers. It also considered the socio-economic and cultural aspects associated with ASF occurrence [3]. Veterinary controls were strengthened all along the pig production chain in an increasingly rigorous manner. More stringent rules were applied to hunting, including safe disposal of wild boar offal. Control measures were accompanied by very intensive education, awareness and communication activities, targeted at farmers, hunters and the rural population. Open-air, double-fenced pig farms were authorised and subsidised, as an alternative to keeping free-ranging pigs. However, almost 5,000 free-ranging pigs had to be culled during some 60 military-type actions carried out from November 2015 [2].

The current situation can be summarised as follows:

- **Domestic pigs:** The actions taken have led to decreasing numbers of outbreaks on domestic pig farms, with the last outbreak occurring in September 2018.
- **Free-ranging pigs:** Evidence gathered over the last few years indicates that free-ranging pigs acted as the main source and reservoir of ASFV; this information helped to overcome resistance to the culling of free-ranging pigs.
- **Wild boar:** A large amount of data suggests that, in Sardinia, ASFV does not persist in wild boar alone for more than a few years if the boar are not re-infected by free-ranging pigs or domestic pigs.

Free-ranging pigs in central Sardinia. © Stefano Cappai

> Complete eradication will most likely be achieved in the near future

The very favourable ASF situation in Sardinia after the implementation of the new programme is summarised in Table I.

Table I. African swine fever (ASF) situation in Sardinia

Wild boar (estimated current population in Sardinia: around 90,000 head)				Free-ranging pigs					Domestic pigs (estimated current population in Sardinia: 180,000 head)	
ASF virus findings on hunted wild boar in the so-called 'infected area' (central Sardinia and surroundings) during the hunting season (HS) from November to January				Indirect evidence indicated that ASF was endemic in free-ranging pigs in central Sardinia					Outbreaks in the whole of Sardinia	
	Tested	Virus+	%							
HS 2012/13	2,363	11	0.46						2012	74
HS 2013/14	2,047	40	1.95						2013	109
HS 2014/15	1,479	9	0.61						2014	40
Spring 2015: Start of the new eradication programme										
HS 2015/16	2,859	13	0.45	478 free-ranging pigs culled between November 2015 and September 2016					2015	16
HS 2016/17	4,106	39	0.65	As from December 2017: depopulation of >4,500 free ranging pigs in central Sardinia					2016	23
					Culled	Tested	Virus+	%		
HS 2017/18	5,188	24	0.46	Dec. 2017 / June 2018	2,408	1,317	53	2.9	2017	17
HS 2018/19	5,587	4	0.072	July 2018 / Feb. 2019	1,429	840	15	1.8	2018	5
HS 2019/20	6,137	0	–	Winter 2019/20	665	384	0	–	2019	0

It is possible that ASFV may be occurring at very low levels in wild boar in some remote areas, as decreasing numbers of seropositive wild boar are still found. However, these seropositive wild boar do not appear to play a significant epidemiological role, and the path towards eradication is very clear.

♦ Complete eradication will most likely be achieved in the near future, provided that current measures are continued.

Acknowledgements

The author wishes to thank all those who, together, have achieved the excellent results briefly summarised in this paper: farmers and hunters, the Regional Government and Administration of Sardinia, the Ministry of Health, Sardinian Veterinary Services, Forest Guards, and the Regional Agencies for Agricultural Development (Laore), and, for the forests, the University of Sassari, the Istituto Zooprofilattico Sperimentale dell'Umbria e delle Marche, and the Istituto Zooprofilattico Sperimentale della Sardegna.

http://dx.doi.org/10.20506/bull.2020.1.3132

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AROUND THE WORLD

SUCCESS STORIES

Role of swine interprofessional councils or organisations in efficient prevention and control of ASF

The public–private partnership policy in action

SUMMARY

In the face of African swine fever (ASF), public–private partnerships can improve the implementation of contingency plans, help ensure biosecurity within zones free of disease, and rebuild trust in trade. Action against the spread of ASF requires activity to be coordinated between swine interprofessional councils or organisations and veterinary authorities.

KEYWORDS

#African swine fever (ASF), #Europe, #public–private partnership.

AUTHORS

Jacques Servière, Scientific adviser for the International Meat Secretariat (IMS).

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The emergence of African swine fever (ASF) in Europe – infected wild pigs were detected in Belgium (September 2018) and Poland (autumn 2019)[(1)] – triggered tightening of existing preventive measures to protect the pig industry and wildlife of neighbouring countries. These measures are based on risk mitigation strategies, and are designed to produce readiness to implement zoning or compartmentalisation policies. This allows trade to be maintained from disease-free zones or compartments, avoiding discontinuation of the exportation of certain products from the country.

Public–private partnership

A public–private partnership (PPP) is a joint approach in which the public and private sectors agree on responsibilities and share resources and risks to achieve common objectives and deliver sustainable benefits. Under PPP, actions against the spread of ASF can be coordinated more efficiently between swine interprofessional organisations and the animal health authorities. A PPP policy can be adapted to improve biosecurity within zones and compartments. In addition, PPP contributes to rebuilding trust between trading partners. This requires all stakeholders to have awareness and knowledge of biosecurity measures and their own roles and responsibilities.

(1) See updated information regarding the ASF situation in Europe in the OIE World Animal Health Information System database.

http://dx.doi.org/10.20506/bull.2020.1.3133

RESOURCES

JOINT PUBLICATIONS

Global control of African swine fever

A GF–TADs initiative. 2020–2025

©Technotr/E+/Getty Images

Published by the Food and Agriculture Organization of the United Nations (FAO) and the World Organisation for Animal Health (OIE)
2020

FAO ISBN: 978-92-5-132653-4

OIE ISBN: 978-92-95115-61-3
10 pages

In the last few years, African swine fever (ASF) has led to a major global crisis in the pork industry, resulting in substantial losses in the pig population worldwide, detrimental socio-economic impacts, and threats to food security. During the 87th General Session of the OIE, the World Assembly of Delegates requested that the OIE produce a global initiative to control ASF. The initiative has been released and it is now publicly available.

[Download the document]

RESOURCES

JOINT PUBLICATIONS

African swine fever in wild boar – ecology and biosecurity

Authors: Vittorio Guberti, Sergei Khomenko, Marius Masiulis & Suzanne Kerba

Published by the Food and Agriculture Organization of the United Nations (FAO), the World Organisation for Animal Health (OIE) and the European Commission
FAO Animal Production and Health Manual No. 22
2019

In English
FAO ISBN: 978-92-5-131781-5
OIE ISBN: 978-92-95115-34-7
DOI: 10.4060/CA5987EN
108 pages

The manual is also available in Korean.

Wild boar are an epidemiological reservoir of African swine fever virus because they can contract, carry and spread the disease. This technical document contains a compendium of essential information about wild boar hunting management, wild boar carcass disposal and other biosecurity measures.

This is the official publication, in the series of FAO Animal Production and Health Manuals, of the former *Handbook on African Swine Fever in wild boar and biosecurity during hunting*. This publication was proposed by the European

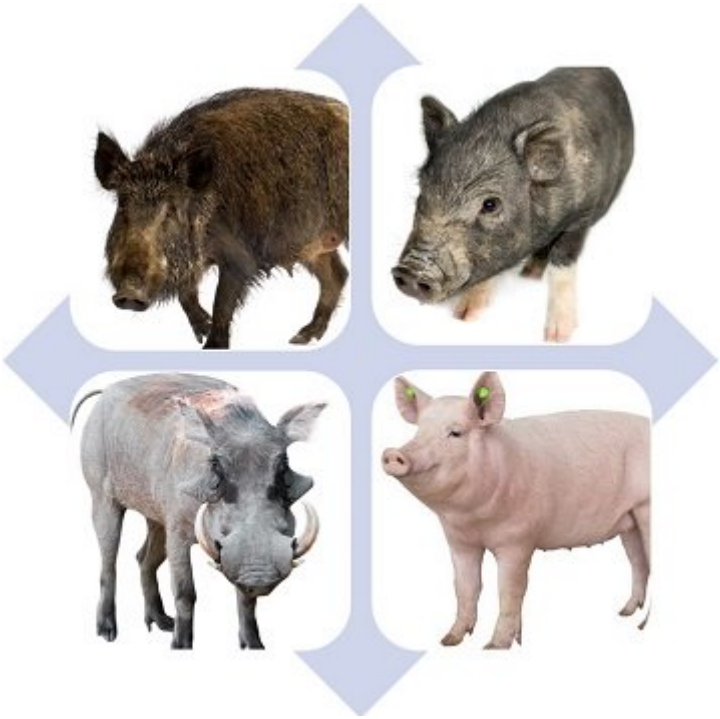
Commission as a follow-up to the recommendations of the Standing Group of Experts on African swine fever for Europe under the umbrella of the GF-TADs for Europe.

[Download the document]

RESOURCES

OIE PUBLICATIONS

Guidelines on compartmentalisation for ASF



World Organisation for Animal Health (OIE)
2020

ISBN: 978-92-95115-64-4

This document, **which is due to be published in September 2020**, aims to assist OIE Members and stakeholders in the pig industry in the practical implementation of compartmentalisation specific to African swine fever (ASF). It details specific requirements and provides guidance on key aspects of the compartmentalisation process and provides a set of tools that may be applied to facilitate the implementation and recognition of compartments.[1]

The private sector and Veterinary Authorities are the main target audience of these guidelines. However, they will also benefit third parties and technical service providers, such as auditors and private veterinarians, involved in the implementation and maintenance of compartments. It is expected that policy-makers in governments and inter-governmental organisations concerned with the animal health and pig industries will also find them useful.

These OIE Guidelines have been developed with the financial assistance of the Canadian Food Inspection Agency.

(1) According to the *Terrestrial Animal Health Code*, 'compartment' means 'an animal subpopulation contained in one or more establishments, separated from other susceptible populations by a common biosecurity management system, and with a specific animal health status with respect to one or more infections or infestations for which the necessary surveillance, biosecurity and control measures have been applied for the purposes of international trade or disease prevention and control in a country or zone.'

RESOURCES

OIE PUBLICATIONS

Strategic challenges to global control of ASF

Technical Item 2 of the 87th OIE General Session

Authors: B. Plavšić, A. Rozstalnyy, J.Y. Park, V. Guberti, K. Depner & G. Torres
World Organisation for Animal Health (OIE)
2019
DOI: 10.20506/TT.2985

During the 87th OIE General Session held in Paris from 26 to 31 May 2019, a report on the strategic challenges to global control of African swine fever (ASF) was presented jointly by the OIE and the Food and Agriculture Organization of the United Nations (FAO) to the OIE World Assembly of Delegates as Technical Item 2.

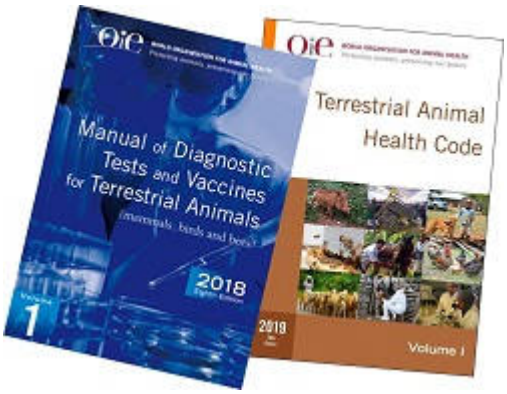
Based on the heightened global threat identified in the report, a call was made for the establishment of a global initiative to control ASF.

[Download the report]
[Watch the presentation of the report at the 87th OIE General Session]

RESOURCES

OIE PUBLICATIONS

OIE technical standards for ASF



The World Organisation for Animal Health (OIE) is an intergovernmental, animal health, standard-setting organisation that develops and publishes science-based standards for animal health and welfare programmes, as well as technical standards for the manufacturing and quality control of tests for use in the diagnosis, prevention and control of animal diseases, including African swine fever.

The technical standards for diagnostic tests are developed and updated collaboratively, through an extensive network of scientific experts in OIE Collaborating Centres and Reference Laboratories throughout the world, and in consultation with Member Delegates who review and approve the final texts through a vote at the annual General Session of World Assembly of Delegates of the OIE. These adopted standards are published in the *Terrestrial Animal Health Code* and the *Manual of Diagnostic Tests and Vaccines for Terrestrial Animals*.

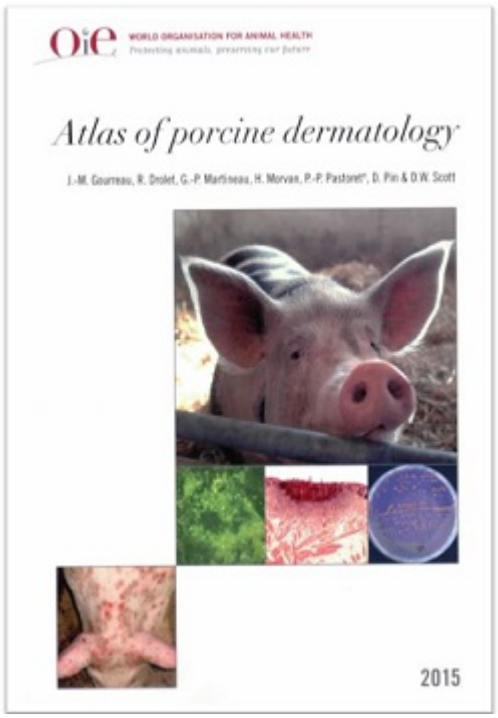
♦ African swine fever is covered in the *Terrestrial Code* Chapter 15.1. and the *Terrestrial Manual* Chapter 3.8.1.

[Order the *Terrestrial Animal Health Code*]
[Order the *Manual of Diagnostic Tests and Vaccines for Terrestrial Animals*]

RESOURCES

OIE PUBLICATIONS

Atlas of porcine dermatology



Authors: J.-M. Gourreau, R. Drolet, G.-P. Martineau, H. Morvan, P.-P. Pastoret†, D. Pin & D.W. Scott

World Organisation for Animal Health (OIE)
2015

ISBN 978-92-9044-984-3
456 pages

This atlas, which has been lavishly illustrated, is the first of its kind and fills a gap in the global veterinary literature. The advantage of this book is that it takes into account all aspects of porcine dermatology (it covers non-infectious diseases and those whose origins are neither parasitic nor fungal), thus facilitating differential diagnosis.

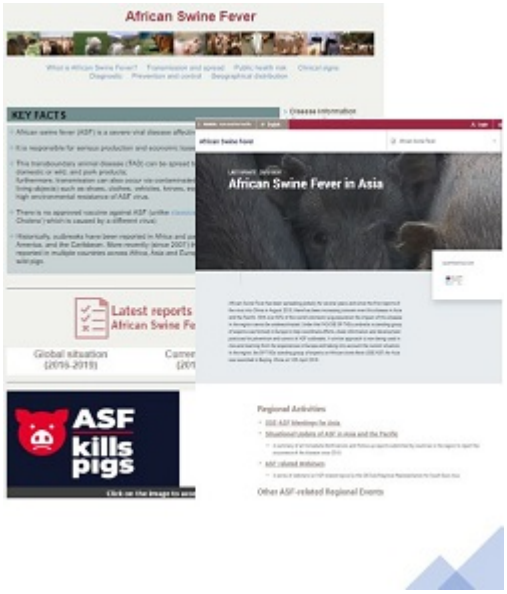
Several of the OIE-listed swine diseases, such as foot and mouth disease, Aujeszky's disease, porcine reproductive and respiratory syndrome, classical swine fever and African swine fever (some of which also affect other species) can result in cutaneous clinical signs in pigs. For many ailments these signs are crucial for establishing a diagnosis.

[Order the book]

RESOURCES

OIE RESOURCES

OIE portals on ASF



The OIE portals on African swine fever (ASF) contain all kinds of information on the disease (disease situation worldwide, way of transmission, clinical signs, prevention and control, etc.), as well as OIE ASF activities, sanitary standards, awareness tools and other resources.

OIE portal on African swine fever
OIE portal on African swine fever in Asia

RESOURCES

OIE RESOURCES

World Animal Health Information System (WAHIS)

The World Animal Health Information System (WAHIS) has been essential in centralising, validating, and publishing timely information on the occurrence of African swine fever (ASF) from the information provided by national Veterinary Authorities. In 2019, 29% of all immediate notifications submitted to the OIE were for ASF.

Through WAHIS, the OIE keeps the international community informed of the evolution of ASF, through alert messages, weekly follow-up reports, weekly regional epidemiological bulletins for Asia and the Pacific, and fortnightly global epidemiological bulletins.

More information about the OIE World Animal Health Information System (WAHIS)
Access the WAHIS interface
The OIE–WAHIS project

RESOURCES

OIE RESOURCES

ASF Watch

'ASF Watch' is a monthly e-newsletter provided by the Documentation Cell of the World Organisation for Animal Health (OIE). It gathers useful scientific literature on African swine fever epidemiology, surveillance and control worldwide.

Suscribe to the OIE ASF Watch

RESOURCES

OIE RESOURCES

‘ASF Kills Pigs’ awareness campaign

In 2019, the World Organisation for Animal Health (OIE) launched an awareness campaign to support countries and key stakeholders in their efforts to prevent the spread of African swine fever (ASF).

The ‘ASF Kills Pigs’ campaign is aimed at people in direct or indirect contact with domestic and wild pigs, or with pork products (including hunters, small and commercial pig producers, travellers and transport authorities). The campaign provides posters, infographics and short animated films, which lay out the precautions that should be taken to protect pig populations and farmers’ livelihoods.

Originally launched in English, Chinese, French, Russian and Spanish, the campaign has been translated into more than ten languages and used and adapted by more than 60 countries worldwide.

[Access the ASF Kills Pigs campaign]

RESOURCES

OIE RESOURCES

ASF-related webinars

Are you looking for technical information on African swine fever (ASF)?

The OIE Sub-Regional Representation for South-East Asia has developed a series of free webinars covering ASF-related topics, such as early detection and rapid response, biosecurity, border control, the treatment of swill feeding, culling and disposal, risk communication and welfare.

Ten webinars have already been given by 19 experts from across the globe and more are to come.

[Access the OIE webinar series on African swine fever]

RESOURCES

EXTERNAL RESOURCES

FAO portal on ASF

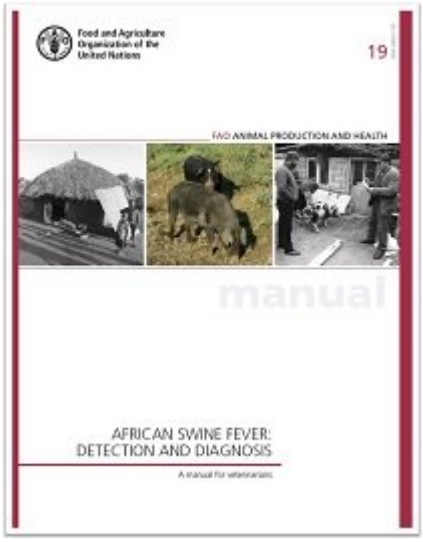
The Food and Agriculture Organization of the United Nations (FAO) African swine fever (ASF) portal provides regular updates on the occurrence of ASF outbreaks, information on ASF virus, FAO recommendations and actions, media releases, FAO documents on ASF prevention and control, and links to partner institutions' ASF resources (e.g. World Organisation for Animal Health, European Commission, European Food Safety Authority).

FAO portal on African swine fever

RESOURCES

EXTERNAL PUBLICATIONS

African swine fever: detection and diagnosis – A manual for veterinarians



Authors: D. Beltrán-Alcrudo, M. Arias, C. Gallardo, S. Kramer & M.L. Penrith

Food and Agriculture Organization of the United Nations (FAO)
FAO Animal Production and Health Manual No. 19
2017

ISBN 978-92-5-109752-6
92 pages

The manual is also available in Albanian, Chinese, Lithuanian, Macedonian, Russian and Serbian.

The purpose of the manual is to provide veterinary professionals, para-professionals and laboratory diagnosticians with the information needed to promptly diagnose and react to an outbreak of African swine fever (ASF). Pig farmers, hunters and forest managers also benefit from this publication because it provides general information on the disease and its causes, including epidemiological information, transmission pathways and geographical distribution. The manual also provides information on the detection and diagnosis of ASF, from field diagnosis (clinical signs, post-mortem findings and differential diagnosis) to laboratory confirmation (i.e. all main techniques for the detection of both virus and antibodies).

[Download the document from the FAO website]

The OIE is an international organisation created in 1924 with a mandate from its 182 Members to improve animal health and welfare. Its activities are permanently supported by 325 centres of scientific expertise and 12 regional offices with a presence on every continent.

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