

EMERGING AND RE-EMERGING DISEASES IN ASIA AND THE PACIFIC

with special emphasis on porcine epidemic diarrhoea

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***Summary:** A questionnaire survey carried out among Members of the OIE⁴ Regional Commission for Asia, the Far East and Oceania revealed the presence of eight emerging and re-emerging pig diseases, of which porcine epidemic diarrhoea (PED) and porcine reproductive and respiratory syndrome (PRRS) appear to cause the most severe economic losses.*

Vietnam and the People's Republic of China recorded huge outbreaks of PED and a new strain of PRRS.

Members of the region in general experience difficulties in establishing diagnosis due to lack of facilities and training. Absence of timely reporting of diseases and lack of relevant epidemiological data also render disease control measures ineffective.

The OIE should continue to provide guidance on the control of emerging and re-emerging swine diseases in the region.

Key words: Asia – Pacific – emerging disease – porcine epidemic diarrhoea (PED) – coronavirus

Introduction

This paper aims to present relevant information on emerging and re-emerging diseases of swine in the region-Asia, Far East and Oceania with special reference to porcine epidemic diarrhoea (PED). In particular, it is also aimed at identifying new diseases which were reported in the countries in the last three years, or diseases which existed before but were not reported or considered absent for the last ten years.

The author, in collaboration with the OIE Central Bureau, designed a questionnaire that was distributed to the members of the OIE Regional Commission for Asia, the Far East and Oceania⁵. Out of 33 members, 11 provided an answer (see [Appendix I](#)). The responses have been analysed and are presented in this paper.

The survey was carried out in view of the emerging importance of PED as a disease and its capacity to inflict significant losses to the pig industry. In addition, the economic impact of the disease was felt directly by some countries in the region, where a series of disease outbreaks were reported.

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4 OIE: World Organisation for Animal Health

5 The OIE Regional Commission for Asia, the Far East and Oceania comprises 33 members, as follows: Afghanistan, Australia, Bangladesh, Bhutan, Brunei, Cambodia, the People's Republic of China, Fiji, India, Indonesia, Iran, Iraq, Japan, the Republic of Korea, the Democratic People's Republic of Korea, Laos, Malaysia, Maldives, Mongolia, Myanmar, Nepal, New Caledonia, New Zealand, Pakistan, the Philippines, Russia, Singapore, Sri Lanka, Chinese Taipei, Thailand, the United States of America, Vanuatu, Vietnam

The disease

Porcine epidemic diarrhoea (PED) is a viral disease of swine caused by coronavirus and characterised by watery diarrhoea and emaciation affecting all ages. Clinical signs include anorexia, vomiting, diarrhoea and dehydration. Thinning of intestines, mostly limited to the small intestine, is pronounced and presents an almost transparent appearance. Undigested milk in the stomach is a common finding during necropsy. The disease is clinically similar to transmissible gastro-enteritis (TGE).

PED was first reported in Belgium and the United Kingdom in 1978, and the causative agent was initially isolated in 1988 with the Vero cell line and trypsin-supplemented medium. The disease has so far been reported in many swine raising countries, notably in Europe and Korea [3].

Although the disease affects all ages, it is most fatal to neonatal piglets. Mortality in piglets older than 10 days is less than 10%, but may reach 100% in piglets less than 5 days old, due primarily to diarrhoea and dehydration [3]. Older pigs recover in about a week but re-infection may occur in five months.

The disease is highly contagious and transmissible mainly by feco-oral route, after the introduction of infected animals or infected materials [2]. The spread is rapid and spontaneous as is its disappearance. It affects both commercial and small farms. The disease is present throughout the year but is more prevalent during cold season.

A number of tests are available for the diagnosis of PED. These include polymerase chain reaction (PCR), immunohistochemistry, direct immunofluorescence (IF) using cryostat sections of gut tissue and enzyme-linked immunosorbent assay (ELISA) on fecal material. Among these tests, IF and ELISA are the most commonly used because of their reliability and sensitivity [1].

Studies have also been carried out on the use of other methods, including a study on the use of recombinant antibody produced in phage antibody system and the immunohistochemical method, which also showed to be both sensitive and reliable [3]. Suitability and relative comparison of diagnostic methods have also been subjects of studies conducted in the field of PED virus.

Although the disease has been known for quite some time, there has been no specific regiment available for treatment. Vaccination is also not probably cost effective. Control measures are in general terms focused on biosecurity. Pigs, particularly piglets, with diarrhoea, should be given unlimited access to water and supported with electrolytes. In the finishing herd, withholding feeds for 1-2 days is also helpful [4]. In the Philippines, a system wherein healthy animals are fed with ground intestines of dead infected pigs to effect a rapid development of immunity, has been claimed to be effective by some farmers and practitioners.

Disease situation

From the information gathered from the respondents, the following were listed as emerging swine diseases: ascariasis, classical swine fever (CSF), foot and mouth disease, porcine circovirus-associated disease (PCV), porcine epidemic diarrhoea (PED), porcine myocarditis, porcine reproductive and respiratory syndrome (PRRS), and swine erysipelas.

In addition to PED, a virulent strain of PRRS recently caused dramatic impact in the People's Republic of China and Vietnam. The disease was manifested by signs not easily identifiable with PRRS. Impact to economies of the affected countries was considerable. In the People's Republic of China, the disease affected all pig farming sectors, whereas in Vietnam it was limited to the backyard sector and never reached the big commercial farms. In Vietnam, the disease appeared spontaneously with rapid spread but disappeared as quickly. This could have been due to the rapid development of immunity, a situation similar to what was observed with PED in the Philippines when veterinarians induced such immunity in susceptible pigs.

Among the respondent countries, only the People's Republic of China, the Republic of Korea, Vietnam and the Philippines have reported cases of PED. However, epidemiological data are mostly incomplete, particularly with regard to the number of outbreaks, morbidity and mortality rates. The Philippines reported the highest number of deaths with approximately 60,000 piglets during 2006 and 2,179 piglets in 2007. The People's Republic of China, on the other hand, recorded 39,128 cases of PED in 2005 with 2,317 deaths (5.92% mortality rate).

PED in the People's Republic of China affected all age groups, while in the Republic of Korea 90% of cases involved piglets less than 10 days old. The Philippines reported that the majority of cases were seen on piglets below three weeks old, but some sows were also reported to exhibit clinical signs of PED.

The People's Republic of China, the Republic of Korea and the Philippines generally implemented similar measures to control PED. Focus on quarantine, disinfection, information dissemination and strengthened

biosecurity programmes were used to manage PED outbreaks. Vaccination is being conducted in the Republic of Korea and the People's Republic of China, and is still on trial in the Philippines. Nonetheless, all the countries claim that the disease is under control.

In the Philippines, most cases of PED were reported during the onset of rainy season. In most cases, samples tested also showed concurrent infections with other viral diseases, notably CSF, PCV and PRRS.

Discussion

Based on the information from the respondents, it appears that the majority of countries in the region are still free from PED. However, given the number of countries which have not provided information sought in the questionnaire, the veracity of this assumption cannot be fully ascertained. Reporting of PED could be dependent on the relative economic importance of the disease in a country as countries which reported the disease (the People's Republic of China, the Philippines, the Republic of Korea and Vietnam) are major pig producers and were greatly affected by the outbreaks.

The data from the respondents, particularly the People's Republic of China and the Philippines, have shown that indeed, PED can cause significant economic losses, with about USD 14.76 million lost in a three-month period due to piglet mortality and other production-related setbacks. It also confirmed previous experiences with the disease recurrence within a given period of time as evident in the waves of outbreaks experienced by the countries.

Country experiences also showed that the spread of PED can be prevented through the implementation of appropriate control measures. The Republic of Korea and Vietnam also reported having controlled PED but additional data is necessary to determine the extent of its damage to the swine industry. Incomplete epidemiological data in general undermines the interpretation and significance of the available data. On the other hand, the manifestations of the disease, particularly its spontaneous appearance and disappearance, could also explain the inability of respondents to provide complete and detailed information.

The effectiveness of particular control measures or programmes implemented to arrest the disease and its further spread cannot also be fully evaluated as there may have been other factors involved. Emphasis should therefore be placed on efforts to collect as much complete information as possible which may not necessarily be obtained directly from the affected farmers. However, this condition does not limit the evaluation of a particular measure employed at the smaller epidemiological unit like a farm or a village. Here again, emphasis should be placed on the need for the information from these smaller epidemiological units to be pieced together to provide a broader perspective of the true disease situation. This will enable a more meaningful evaluation of control measures by technicians and policy makers about the control measures in place.

Equally important is the capability of the country to detect and diagnose the disease. This greatly affects the quality of information that is provided to the central authorities and eventually to the OIE. It also reflects the evaluation programmes in place. Difficulties in diagnosis were experienced in the People's Republic of China and Vietnam during the PRRS outbreaks where the new causative strain was not immediately diagnosed. In Vietnam, the diagnosis was only confirmed after exhaustive testing of samples in the United States. This situation will generally apply to other countries in the region which do not have the required diagnostic capability for specific diseases.

Further, none of the countries that reported PED was able to identify the main point of introduction of the virus into their pig populations but trade of animals and animal products with countries where the disease is known to be present is the most probable source. In order to avoid economic losses from PED, appropriate investigations should be carried out to trace-back infections.

In response to notification criteria for PED to the OIE, no country, except Bhutan, believed that the disease should be made notifiable.

As for the other emerging diseases mentioned, porcine myocarditis, PCV, ascariasis, swine erysipelas and swine influenza are still not included in the OIE List of notifiable diseases. Respondents, except Bangladesh, do not wish to add any other disease to the OIE List of notifiable diseases. New Zealand on the other hand, suggested that the OIE give consideration to increasing the scope of its listed diseases.

The situation presented attributes equal importance to disease control and to disease reporting, which contributes greatly to the efficacy of control measures. It is stressed that despite the technological advances in the diagnostic field, the veterinary profession is still greatly handicapped in combating existing diseases. Weaknesses in the veterinary infrastructure of the countries make disease control further difficult.

The OIE should maintain its leading role in providing guidance on the control of emerging and re-emerging diseases. The current efforts of the OIE in strengthening Veterinary Services is a major initial step that can lead to effective animal disease control.

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Appendix I

Members of the OIE Regional Commission for Asia, the Far East and Oceania having responded to the questionnaire on “Emerging and reemerging diseases in the region with special emphasis on porcine epidemic diarrhoea”

1. Australia
 2. Bangladesh
 3. Bhutan
 4. China (People’s Republic of ~)
 5. Chinese Taipei
 6. Korea (Republic of ~)
 7. Nepal
 8. New Zealand
 9. Philippines
 10. Thailand
 11. Vietnam
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