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Editors: J.V. Conlan, S.D. Blacksell, C.J. Morrissy and A. Colling



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Classical swine fever and foot-and-mouth disease in Lao PDR

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Introduction

Approximately 75% of the population of Lao PDR is engaged in agriculture and the vast majority (approximately 90%) of these producers are in the smallholder sector. Livestock are an important contributor to national, agricultural and village economies and are relied on for food security. The pig population has increased over the past 5 years at an annual average increase of 4.7% at the national herd level and up to 20% in some provinces. Cattle and buffalo populations have grown at more modest rates of 1–2% (Figure 1).

Disease, including foot-and-mouth disease (FMD) and classical swine fever (CSF), is a major constraint to efficient and sustainable livestock production. Up to 80–90% of pigs and 99% of cattle and buffalo are produced in the smallholder sector using low input practices; as such, there is limited private sector input. Disease reporting, diagnosis, control and prevention are addressed by the Lao Government through the National Department of Livestock and Fisheries (DLF) and local agriculture and forestry offices at provincial and district government levels. These activities are supported by international partners such as the Australian Centre for International Agricultural Research (ACIAR), Commonwealth Scientific and Investigation Research Organisation (CSIRO), Japanese International Cooperation Asso-

ciation (JICA), Food and Agriculture Organization (FAO), European Union (EU) and Office International des Epizooties (OIE).

Disease reporting and communication are passive and reports are made from villages through government administrations at district and provincial levels and then to the national level—the DLF and the National Animal Health Centre (NAHC). Communication of FMD-related information at regional and international levels is coordinated by the OIE South-East Asian FMD regional coordination unit (SEAFMD RCU), where reports are submitted monthly. Disease reporting for CSF is less well coordinated and information is provided to the OIE.

Disease diagnosis

Classical swine fever

Initial suspicion of CSF is based on clinical signs. Routinely, the laboratory test used to confirm an outbreak of CSF is the antigen capture (AC)-ELISA (Shannon et al. 1993) for the detection of viral antigen in tissue or the white cell fraction of whole blood. The immunoblotting (IMB)-ELISA (Conlan et al., in press) for antigen detection is used at the NAHC and will be used in provincial laboratories in the future. These tests are supported by ACIAR and reagents are supplied by the CSIRO Australian Animal Health Laboratory (AAHL), Geelong, Australia. Capacity at the NAHC for virus isolation and the fluorescent antibody test (FAT) has been developed in cooperation with JICA; however, these tests are not routinely used.

Antibodies to CSF are detected in serum using the complex trapping blocking (CTB)-ELISA (Blacksell 2001) with the support of ACIAR and CSIRO

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AAHL. The capacity to use the ‘gold-standard’ neutralising peroxidase linked assay (NPLA) has been developed but is not routinely used.

Foot-and-mouth disease

As with CSF, initial suspicion of FMD is based on clinical signs. Diagnosis of FMD is confirmed in the laboratory using the indirect sandwich ELISA and subtypes A, O and Asia 1 can be identified. Virus isolation in tissue culture can be done but is not routinely used.

Antibodies to FMD virus are detected in the serum of cattle, buffalo and pigs using the liquid phase blocking (LPB)-ELISA. During surveys to specifically look for naturally infected animals, the non-structural protein (NSP)-ELISA (CEDI Diagnostics, the Netherlands) is used.

Epidemiology of CSF and FMD

Classical swine fever

As the identification of CSF outbreaks is based on a system of passive surveillance, the incidence of CSF is probably under-reported. In 2003 five outbreaks in three provinces were laboratory confirmed: Bolikhamxay (3), Luang Namtha (1) and Xieng Khouang (1). In 2004, 11 outbreaks in six provinces were identified: Bolikhamxay (6), Khammuane (1), Vientiane Capital (1), Luang Prabang (1), Houaphan (1) and Bokeo (1). In 2005 five outbreaks in two provinces were confirmed in the laboratory: Bolikhamxay (2) and Vientiane Capital (3).

In 2006 up to October, 10 outbreaks in three provinces were identified: Bolikhamxay (2), Vientiane Capital (7) and Luang Namtha (1). Refer to Figure 2 for location of outbreaks and the season in which they occurred.

In 2006 a serological survey for CSF and FMD was conducted in five northern provinces, Oudomxay, Luang Prabang, Phongsaly, Xayabouly and Houaphan. The survey was conducted with the support of the FAO ‘Transboundary Animal Disease in the Greater Mekong Sub-region’ project, OIE SEAFMD RCU and the ‘Lao–Australian Animal Health Research’ project (ACIAR Project Number AH/2003/001). The CTB-ELISA was used to detect antibodies to CSF virus (Table 1).

Table 1. Sero-prevalence of classical swine fever in five northern provinces of Lao PDR, 2006

Province	Number of districts	Number of villages	Number of pig samples	Per cent sero-positive
Oudomxay	5	8	55	11
Luang Prabang	7	13	91	13
Phongsaly	7	13	88	15
Xayabouly	7	12	84	15
Houaphan	8	23	161	6

Foot-and-mouth disease

The predominant strain of FMD virus causing outbreaks in Lao PDR is type O. A small outbreak caused by type A occurred in Bokeo province in 2003, and no outbreaks of type Asia 1 were detected

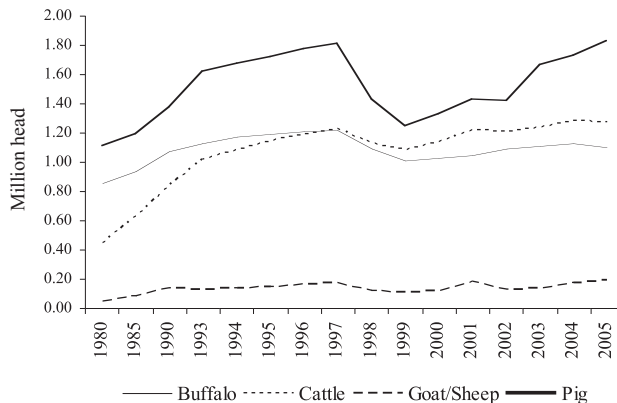


Figure 1. Livestock population trends from 1980 to 2005

in the Lao PDR in the period 2003–06. In 2006 no outbreaks of FMD had been reported up to October (Figure 3). As described above, a sero-prevalence survey for CSF and FMD was conducted in 2006 (Table 2). In 2005 a survey in four provinces, Savannakhet, Vientiane Capital, Huaphan and Xieng Khouang, was conducted to measure the serological prevalence of naturally infected animals (Table 3). In both sero-surveys the NSP-ELISA (CEDI Diagnostics, the Netherlands) was used to detect antibodies to FMD virus.

Table 2. Sero-prevalence of foot-and-mouth disease in five northern provinces of Lao PDR, 2006

Province	Number of districts	Number of villages	Number sampled	Per cent sero-positive
Oudomxay	5	8	112	0
Phongsaly	7	13	163	0
Huaphan	8	23	323	1
Luang Prabang	7	13	181	13
Xayabouly	7	12	168	14

Table 3. Sero-prevalence of foot-and-mouth disease in four provinces of Lao PDR, 2005

Province	Number sampled	Per cent sero-positive
Savannakhet	280	2
Xieng Khouang	765	0
Huaphan	458	0
Vientiane Capital	60	30

Disease control

Classical swine fever

There is no official policy for the control of CSF; however, vaccination is strongly encouraged and animal movement during an outbreak is discouraged. Prevention of CSF is also quite difficult to achieve in the smallholder farming sector. Vaccination is not routinely used (approximately 8% of the national herd is vaccinated) and regular trading of sick pigs facilitates disease spread.

Foot-and-mouth disease

Control of FMD is better coordinated than CSF control. It is highly reliant on a high level of awareness at village, district and provincial levels to rapidly report suspected cases of FMD and submission of samples for laboratory testing. National veterinary staff are responsible for implementing animal movement control once an outbreak occurs, and this may involve personnel from other ministries, including police notification to prevent animal movement. Livestock traders are also engaged, and trading of livestock and animal products during an outbreak is prohibited.

Lao PDR does not produce vaccine for FMD and does not have a routine vaccination program to prevent or control outbreaks of the disease. Bilateral agreements between the governments of Thailand and Lao PDR result in the supply of vaccine for emergency ring vaccination during an outbreak.

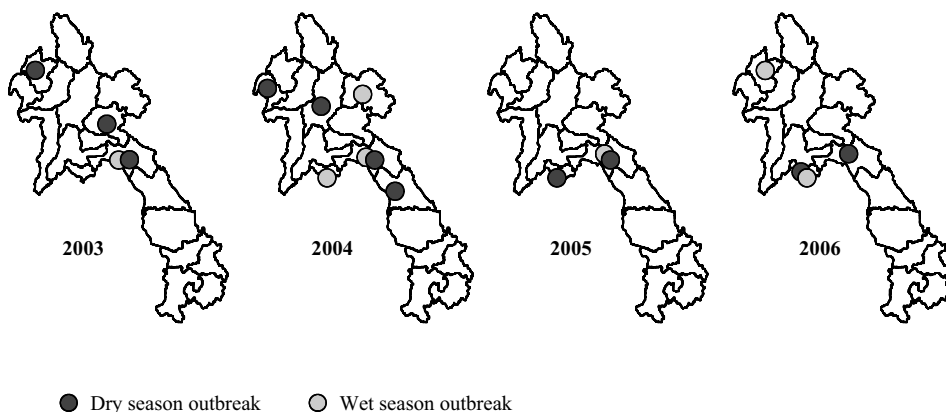


Figure 2. Outbreaks of classical swine fever, 2003–06

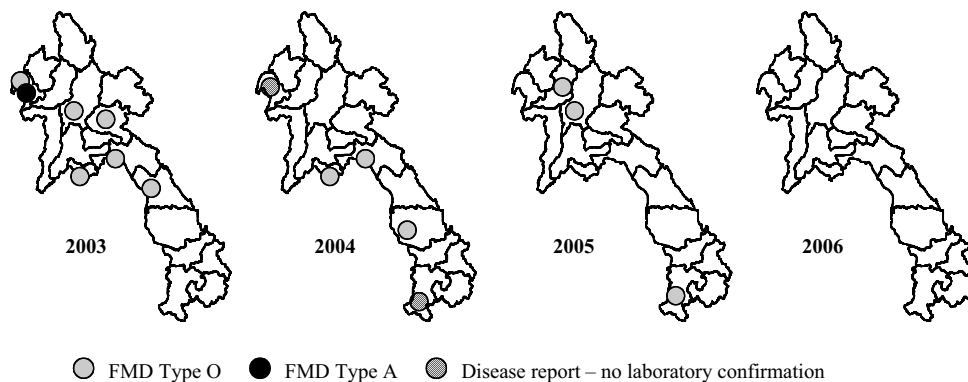


Figure 3. Outbreaks of foot-and-mouth disease (FMD), 2003–06

As mentioned above, control is reliant on a high level of disease awareness. During outbreaks, public awareness initiatives are undertaken to educate farmers and traders about the risks of disease spread.

Future activities

The control and prevention of these trans-boundary animal diseases require an ongoing commitment from all stakeholders involved in livestock production. In the future, activities will be undertaken in collaboration with international partners to strengthen the capacity of provincial and district livestock officers to recognise and control disease outbreaks. This will involve specialist training in disease recognition, disease reporting, sample collection and submission, and public awareness.

Other activities will include:

- introducing improved diagnostics and control methods for CSF, with a particular focus on implementation of the newly developed IMB-ELISA for rapid diagnosis in provincial laboratories
- scaling up vaccination programs for, and public awareness of, CSF

- engaging and working with livestock traders and providing education materials to minimise the risk of disease spread
- continuing to work with international partners to prevent the movement of illegal animals and animal products in the Greater Mekong subregion.

References

- Blacksell S.D. 2001. Classical swine fever in the Lao People's Democratic Republic: Virological, epidemiological and clinical studies. PhD thesis, Department of Microbiology and Parasitology, University of Queensland.
- Conlan J.V., Khounsy S., Blacksell S.D., Morrissy C.J., Wilks C.R. and Gleeson L.J. Development and evaluation of a rapid immunomagnetic bead assay for the detection of classical swine fever virus antigen. *Tropical Animal Health and Production*, in press.
- Shannon A.D., Morrissy C.J., Mackintosh S.G. and Westbury H.A. 1993. Detection of hog cholera virus antigens in experimentally infected pigs using an antigen-capture ELISA. *Veterinary Microbiology* 34, 233–248.