Classical Swine Fever in Lao PDR

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Abstract

Pig disease is the major problem for pig farmers in Lao PDR. Classical swine fever (CSF) is endemic in Lao PDR with many outbreaks reported annually. It accounts for a large number of pig deaths in all pig-raising systems. Pig-raising is popular throughout Lao although the northern Lao people tend to keep a higher number of pigs because of traditional customs. In Northern Lao, it has been reported there is an average of 3.7 pigs per family, in Central Lao, 1.4 pigs per family, and in Southern Lao 2.3 pigs per family. There are three pig-raising systems in Lao PDR: smallholder, small family business and semi-intensive.

DUE TO THE recent economic crisis in this region, investment in the livestock production sector has decreased marginally during the past few years although the demand for meat and fish is gradually increasing in line with the population demands of Lao Peoples' Democratic Republic (Lao PDR).

The problem faced by the Department of Livestock and Fisheries (DLF) of Lao PDR is primarily to facilitate food security to the provincial areas in addition to increasing the supply of good quality meat and fish to the major towns of the country.

Pork production is approximately 5 kg/person/year and accounts for 25% of total meat production. Regarding the export market, 3% of pork production is sent to other countries and pork production is increasing at a rate of 3% per year.

The estimated livestock populations in Lao PDR of the previous 10 years are summarised in Table 1.

Pig Breeds and Husbandry Techniques

Four native pig breeds are recognised in Lao PDR. In a survey undertaken by the DLF to determine the phenotypic characteristics of pigs in Lao PDR and provide recommended groupings, four distinct groups, *Moo Chid*, *Moo Laat*, *Moo Daeng* and *Moo Nonghaet* were recognised. Of the imported breeds, Landrace and Duroc are popular although raised to a much lesser extent than native breeds. Pig feed in Lao PDR is usually rice bran, corn, cassava, alcohol production waste, edible grasses or weeds and waste food. Commercial pig feeds are generally only used in urban and peri-urban areas of Vientiane City.

Approximately 64% of families in Lao PDR raise pigs for sale or consumption. Pig-raising is generally performed by smallholder farmers and is popular as a form of supplementary income for rice farmers. Pig-raising is popular throughout Lao although the northern Lao people tend to keep a higher number of pigs because of traditional customs. In Northern Lao, it has been reported there is an average of 3.7 pigs per family, in Central Lao, 1.4 pigs per family, and in Southern Lao 2.3 pigs per family. There are three pig-raising systems in Lao PDR: smallholder, small family business and semi-intensive.

Table 1. Livestock in Lao PDR 1988–98.

Year	Buffalo	Cattle	Goat/Sheep	Pigs
1988	1 040 730	764 100	89 200	1 267 880
1989	1 026 160	816 530	105 160	1 349 980
1990	1 071 750	841 900	139 410	1 392 100
1991	1 103 910	892 390	154 720	1 433 160
1992	1 130 720	992 980	103 890	1 560 920
1993	1 134 200	1 019 840	127 550	1 624 670
1994	1 168 230	1 081 010	141 600	1 673 390
1995	1 191 410	1 145 870	152 930	1 723 590
1996	1 211 700	1 186 000	159 000	1 772 000
1997	1 223 800	1 227 500	165 000	1 813 000
1998	1 092 740	1 126 600	122 170	1 432 140

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The smallholder system employs 1–3 native pigs in a village situation. The pigs may roam freely in the village or be penned, and are given poor quality feed or forage in the village. This method of production accounts for 96% of all Lao pig production. The small family business system employs 3–6 native or imported breed pigs generally in a village or backyard situation. The pigs are penned and are given improved feed. This method of production accounts for 3% of all Lao pig production. Semi-intensive pig farming systems employ large numbers of imported breed pigs in a farm situation and are fed commercial feed that may be mixed with local improved feeds. This method of production accounts for 1% of all Lao pig production.

Constraints to Production

Pig disease is the major problem for pig farmers in Lao PDR. Classical swine fever (CSF) and most probably many other viral diseases account for a large number of pig deaths in all pig-raising systems. Bacterial diseases such as *Salmonella cholerasuis* and *Erysipelothrix rhusiopathiae* (the aetiological agent of swine erysipelas) also have a large impact, as well as parasitism in village pigs, such as *Ascaris suum*, resulting in retarded growth of the pigs.

The lack of quality vaccine, vaccine cold chains and veterinary or para-veterinary staff to apply the vaccines is also a problem. Problems in delivery and processing of quality feeds is also another constraint.

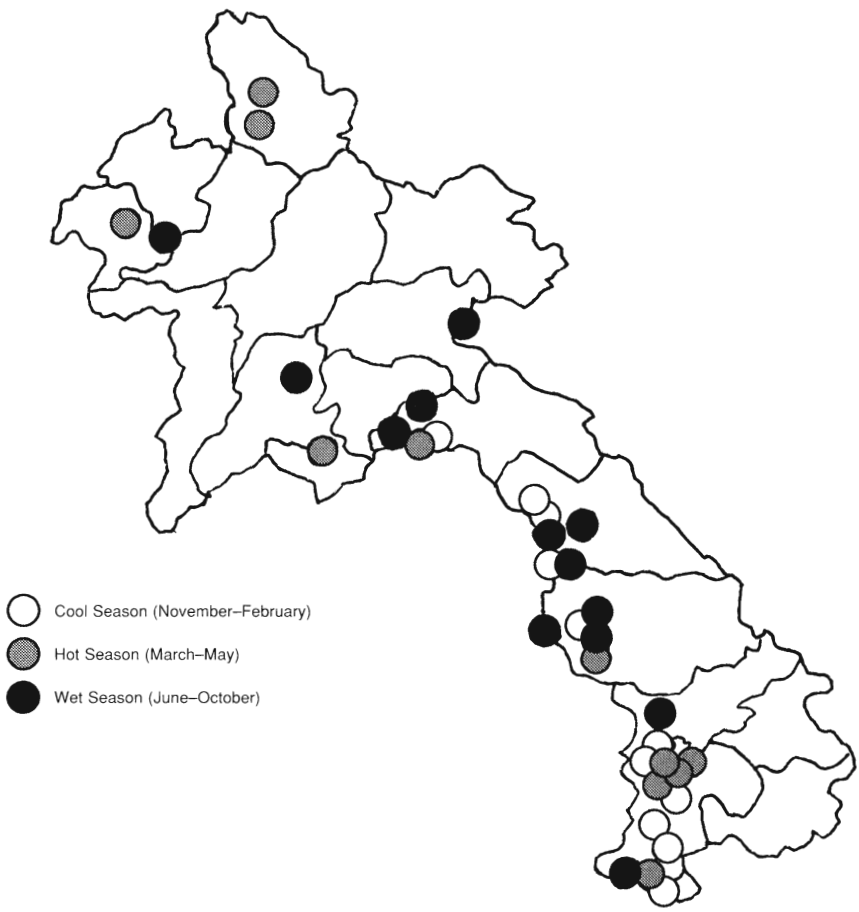

Figure 1. Incidence of CSF infections diagnosed in Lao PDR during 1998.

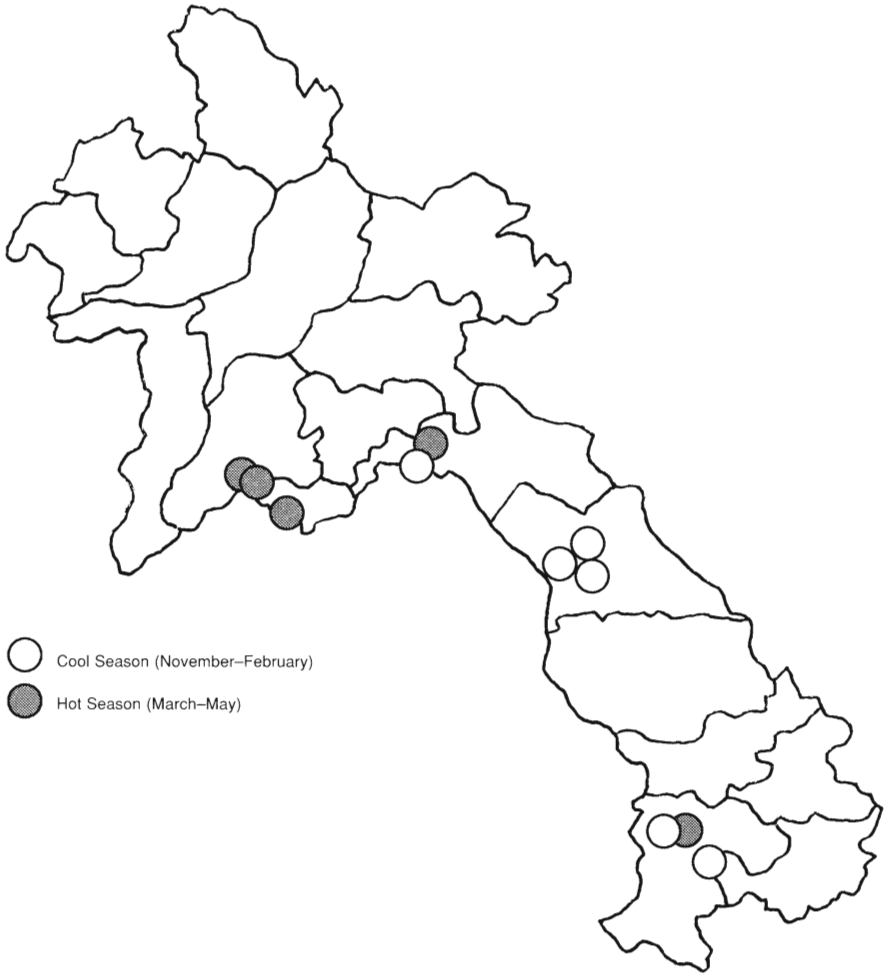

Figure 2. Incidence of CSF infections diagnosed in Lao PDR to June 1999.

Commercial pig feed is expensive by local standards and is therefore employed only in larger production systems. Improved feeds such as cassava, corn and rice bran are used by some farmers but availability, expense of production and processing time are a problem.

Marketing and management can be difficult, depending on the location, as travel to market to sell the pigs may be expensive as well as difficult, or impossible, due to poor or impassable roads. In such cases, a middle-man trader may visit the village and offer sub-standard prices, further compounding the marketing problems for small-scale pig producers.

Local or native pig breeds are not genetically improved and therefore do not provide as good a feed-conversion ratio as imported breeds.

Current CSF Situation

CSF is endemic in Lao PDR with many outbreaks reported annually. The level of incidence is influenced to a large extent by the demands of local pork requirements where pigs are transported by vendors or middle-men. Illegal international animal trade may also contribute to the spread of CSF as the country is an established thoroughfare to major markets in neighbouring countries. Additionally, as a large percentage of pig production in Lao PDR is derived from village smallholders where farmers keep animals in a free-ranging fashion, this factor may have an influence in some sporadic outbreaks of CSF.

The routine diagnosis at the ACIAR project laboratory in Vientiane is performed using the CSF

antigen capture ELISA (CSF AC-ELISA). Samples are submitted to the laboratory via a provincial and district sample submission network. In 1998, the project laboratory received 257 samples. Fifty were CSFV antigen positive representing 35 outbreaks (19.5% of the total samples submitted) (Figure 1). In 1999, 87 samples were received with 19 positive samples from 11 outbreaks (21.8%) (Figure 2).

External Assistance

The Lao Government has quite limited national budget resources for the financial support of CSF control activities. Nevertheless, in the previous year the Lao Government has received strong support from donor agencies in the form of bi-lateral or regional veterinary services projects. The Australian Centre for International Agricultural Research (ACIAR), the European Union project 'Strengthening livestock services' have provided support which has enabled Lao PDR to implement a CSF research program to meet the needs of the country.

The following summarises the work of selected projects working on CSF in Lao PDR over the previous 12 months.

ACIAR project

ACIAR project 9438 is a three-year project providing laboratory facilities for CSF diagnosis for both antigen detection and serology. A resident Australian scientist provides training and support to local staff in the implementation of the diagnostic techniques. Furthermore, serological surveys to determine the prevalence of CSF antibodies throughout the country have been undertaken. During 1998–99, the following were accomplished:

Infrastructure and institutional strengthening

- Commissioning and opening a refurbished laboratory for CSF and FMD Diagnosis;
- Training Lao staff in the diagnosis of CSF using ELISA techniques;
- Establishment of a provincial sample submission network to facilitate the collection and transport of samples to the project for diagnosis;
- 20 staff from four provinces trained in surveillance and data analysis prior to CSF survey work.

Serological surveys

- Using active surveillance techniques, approximately 2000 sera were collected from four provinces;
- More than 2000 sera were collected from abattoirs in eight provinces.

European Union project

Project ALA/96/19, 'Strengthening of livestock services and extension activities', is a six-year project. The main objectives are to strengthen veterinary services and the extension network at all levels for an efficient and sustainable delivery of animal health and production services, and thereby to reduce disease incidence, improve management practice and increase livestock productivity. This project has no explicit focus on CSF but different components can support the Government of Lao PDR in CSF control activities. The project has started only recently and is expected to become fully operational in 1999.

Conclusion

CSF is the most important pig disease in Lao PDR. Control strategies for it face constraints in technical and human resource areas. The ACIAR project has provided valuable resources and training in CSF diagnosis and control. Strong support via external assistance is required to continue research into CSF in Lao PDR.

Pig Production and Classical Swine Fever in Vietnam

Nguyen Tien Dzung[1]

Abstract

Vietnam is a Southeast Asian country bordered by China to the north, PR Laos and Kampuchea to the west, and the South China Sea to the east and south. It has 78 million inhabitants in an area about 320 000 km^2. The climate is tropical, hot and humid and north of the 16th parallel, it is cold in winter (November–April). Livestock consists mainly of pigs (18 million), cattle and buffalo (6 million) and poultry (180 million). This paper outlines pig production in Vietnam and then details the situation of classical swine fever (CFS), still the most important disease in pig production.

MORE THAN 80% of pig production in Vietnam occurs in the household or smallholder sector of the population. Typically, each household owns 2–3 pigs. At the same time, commercial or intensive pig-raising with small herds (10–20 pigs) is occurring in this sector, especially in the deltas of the Mekong and the Red rivers, where the focus is mainly on breeding. Large pig farms (hundreds to thousands of sows) also occur in the south and to a lesser degree in the north.

Native pig breeds are the I, the Mong cai, the Baxuyen and the H'mong. They are found now only in the household sector and in lower numbers than European pigs. The latter have the advantage of being lean and fast-growing, and are becoming preferred in pig husbandry.

Feed in the traditional household sector consists of kitchen waste, paddy brands, vegetables and some grains. The pigs are often unleashed to supplement-feed in the backyards. The use of industrially-processed feed is growing and many foreign companies dominate the market.

Classical Swine Fever

Clinical signs

The disease was first diagnosed in Vietnam in 1924. Since then it has been considered the most devastating disease in pig production. The course is normally acute and sub-acute. The clinical signs of the disease are the same as in 1924. In the 1990s, the chronic form of the disease became generalised. It is characterised by stunting and constipation in growing pigs and reproduction trouble in breeders. Virus carrier state has been repeatedly reported.

Epidemiology

The prevalence of CSF is not well recorded. Statistics data exist but are difficult to interpret. The seasonal character of CSF occurrences was established, more than 80% of outbreaks occurring in the cold season. The condition was linked to the massive slaughtering of pigs for the Tet (the Lunar New Year) festivities in that season and, consequently, the movement of new stock piglets to replace slaughtered ones. Nowadays, as life improves, pork meat demand extends all year, and so pigs are slaughtered all year. In addition, vaccination occurs more often. The seasonal character is no longer valid and the disease has become endemic. The spreading of the disease is strongly linked with the circulation of pigs and pork meat.

Diagnosis

CSF is diagnosed mainly by clinical signs. At the extreme, every diseased pig that does not respond to antibiotic treatment is considered as being infected with CSF. At autopsy, the lesions are, in most cases, sufficient to establish CSF diagnosis, but such tests are not often applied to living pigs as no compensation policy exists that allows the veterinarian to do so.

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Two laboratories (one in Hanoi, another in Ho Chi Minh City) are now capable of CSF diagnosis. The techniques used there are immunofluorescence and ELISA. The number of samples received for CSF diagnosis is not as high as in European countries, because the test is costly and pig owners are not willing to pay the charges.

ELISA has helped to detect virus carrier sows. The prevalence of CSFV carrier pigs was reported as high as 15% on some farms.

Prevention and control

Vaccination against CSF has been practised since 1960 in Vietnam. At that time in the north, the vaccine was produced using the C-strain, and in the south, the Japanese GPE$^{(-)}$ strain. Now all home vaccine is produced with the C-strain in the freeze-dried form. Vaccines are sufficiently produced, but some foreign vaccines are also authorised for import. The vaccination campaigns are executed twice per year under the responsibility of the Provincial Veterinary Service. Complementary vaccination is realised by the practitioners. The pig owners pay the vaccine and the service cost, except in the mountainous regions where the State pays the vaccination cost.

Results of vaccination are assessed and reported by the Provincial Veterinary Service only as the proportion of pigs being vaccinated. The figure varies greatly from one to another location. The vaccination efficacy remains obscure. CSF is a communicable disease and vaccination is compulsory under the State Ordinance on Veterinary Activities issued in 1993. But vaccination is still far from being satisfactorily implemented. Difficulties encountered in vaccination campaigns are:

- lack of vaccine-keeping facilities (the cold chain);
- pig-catching (in many regions, pigs are raised unconfined); and
- lack of acceptance by the pig owners.

These conditions are more pronounced in the regions where the economy still bears the character of auto-sufficiency. Hopefully, the situation is changing through the policy adopted by the Vietnamese State, i.e. to convert its economy into a market economy.

Other prevention measures adopted for fighting CSF are the inspection of animal movement and pork meat. Only animals previously vaccinated against CSF are allowed to be transported.

Measures to be applied in a CSF outbreak are also established and are similar to those adopted elsewhere. Another weak point in the control of CSF is the lack of certain diagnosis at the early stage of the outbreak. Being afraid of restrictions on animal movement imposed by the control measures, pig owners often do not inform the authorities of the presence of CSF.

Classical Swine Fever in Hong Kong

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Abstract

Classical swine fever (CSF) is considered to be endemic in Hong Kong and outbreaks of acute CSF have occurred in any month of the year during the past 12 years. It is a notifiable disease. Vaccination with live attenuated vaccine is widely used in pig herds. However, outbreaks of disease have apparently occurred in vaccinated herds. In the past two years, few outbreaks of typical acute CSF have been confirmed. The status of chronic and lower virulence cases of CSF within pig herds is uncertain. Recently, diagnosis has been based on clinical signs and gross and microscopic pathological findings. Introduction of testing for virus antigen or genome detection is planned to confirm CSF diagnosis, to determine the prevalence of lower virulence or chronic disease and to investigate cases of apparent vaccine breakdown.

THE PIG-RAISING industry within Hong Kong consists of approximately 330 farms with a total herd of approximately 400 000 pigs. Farm size varies considerably from 20–30 sows to more than 1000 sows. The pigs are mostly run indoors on solid or slatted floors. Farms are required to prevent untreated waste from entering watercourses and most have installed and operate waste treatment facilities involving anaerobic and aerobic fermentation systems on site. Pigs are usually fed imported formulated rations.

Disease in pigs with clinical signs and pathology typical of classical swine fever has been seen at the Castle Peak Veterinary Laboratory of the Agriculture and Fisheries Department since the laboratory was established in the early 1970s (D. Higgins, pers. comm.). Early diagnosis was based on clinical and pathological findings with no confirmatory antigen or virus detection tests conducted.

In the late 1980s, antigen detection by immunoperoxidase staining of CSF antigen in cryostat sections of tonsils was used to confirm the diagnosis of CSF in pigs with clinical signs and pathology typical of acute or chronic CSF (K.S. Lo, pers. comm.). Immunological reagents from CVDL Lelystad were used. Subsequently, diagnosis was based on clinical findings and gross and microscopic pathology from 1992 until this year, when a PCR procedure for CSF based on primers selected by Dr F. Leung, Zoology Department, University of Hong Kong, was introduced.

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Recent CSF Incidence Data

The number of CSF outbreaks reported and diagnosed from pig-raising farms in Hong Kong since 1987 is summarised in Table 1. Details of the number of pigs affected and the number of deaths in the outbreaks are shown as well as the month(s) during which outbreaks occurred for that year. The procedures used for diagnosis of CSF in these outbreaks are also summarised.

Control of CSF in Hong Kong

The disease is at present accepted as being endemic in Hong Kong and, as such, no specific restrictions are placed on farms where disease is diagnosed. Advice is given on farm control including decontamination and management procedures to lessen the spread. The main control method recommended is vaccination.

Five CSF vaccines are registered for use in Hong Kong including Pest-Vac (Fort Dodge), Suvac (Sanofi), Pestiffa (Rhone Merieux), Kinavac (Syva Laboratories), and a lapinised hog cholera vaccine from Taiwan. The registered vaccines are all live attenuated vaccines based on the lapinised China strain of CSF. Vaccines are generally used following

Table 1. Classical swine fever cases in Hong Kong since 1987.

Year	Months	No. outbreaks	No. pigs affected	No. deaths	Method of diagnosis
1987–88	Jan, Mar, Jun, Jul, Aug	9	501	206	Clin/Path, Ag detect by immunoperoxidase staining
1988–89	Jan, Mar	3	1000	930	Clin/Path, Ag detect by immunoperoxidase staining
1989–90	Apr, May, Jul, Aug, Sep, Oct, Nov, Feb, Mar	21	2826	928	Clin/Path, Ag detect by immunoperoxidase staining
1990–91	Apr, May, Jun, Sep, Nov, Feb	10	1362	569	Clin/Path, Ag detect by immunoperoxidase staining
1991–92	Apr, Jun, Nov, Dec, Jan, Feb	11	438	315	Clin/Path, Ag detect by immunoperoxidase staining
1992–93	Apr, May, Jul, Nov, Dec, Mar	9	1155	729	Clin/Path, Ag detect by immunoperoxidase staining
1993–94	Apr, May, Jun, Jul, Aug, Nov, Dec, Jan	17	2117	607	Clin/Path
1994–95	Apr, Nov, Jan, Mar	5	5325	128	Clin/Path
1995–96	Dec, Feb	2	900	120	Clin/Path
1996–97	Jul, Sep, Oct, Dec, Jan	5	655	280	Clin/Path
1997–98		0	0	0	Clin/Path
1998–99	Feb	1	150	100	Clin/Path, PCR

the manufacturers' recommendations with respect to age of vaccination and requirement for secondary or booster vaccinations.

However, an unusual practice has been reported locally where piglets are vaccinated just after birth before colostrum has been ingested. The effect on the immature lymphoid system of these piglets, even by the attenuated lapinised China strain, is not known at this time, and it is interesting to speculate what effect this may have on infections with other porcine viruses or bacterial infections.

Discussions with veterinary wholesalers supplying vaccines indicate that approximately 725 000 doses of the registered CSF vaccines are used in Hong Kong annually.

Future Activity

Introduction of antigen detection and antibody ELISAs for CSF, establishing tissue culture facilities with immunofluorescent staining for CSF-infected cells and further utilisation of the PCR test are all planned to improve diagnostic capability for CSF.

These procedures will be used to confirm CSF diagnosis and further investigate cases where CSF vaccination does not seem to have prevented the disease. Additionally, the effect of day-old piglet vaccination on persistence and efficacy of the CSF vaccines will be investigated and the industry will be advised of any adverse effects of this practice. The impact of other viral agents known or suspected to occur in Hong Kong on the response to CSF vaccination or infection with field strains of CSF virus will also be examined.

Acknowledgment

The assistance of Mr Pang Tak Hing in collecting information about CSF vaccine usage in Hong Kong and providing statistical information on CSF case occurrence since 1987 is gratefully acknowledged.