PARTNER COUNTRY: Laos
PROJECT: Management of CSF and FMD at the village level in Lao PDR (AH/2003/001)
DESCRIPTION: Using minute magnetic beads, scientists from Australia's CSIRO Livestock Industries have developed a rapid diagnostic test for detecting classical swine fever—one of the most problematic diseases for pigs in Laos
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ANIMAL MAGNETISM CHECKS DISEASE

Scientists have developed an important new 'rapid test' for detecting the diseases that can ruin small-livestock farmers in Laos

BY WHITNEY MACDONALD

The answer to improving disease diagnosis in Laotian livestock may lie in tiny magnetic beads smaller than a pinhead.

Scientists from Australia's CSIRO Livestock Industries have developed a rapid diagnostic test for detecting classical swine fever (CSF)—one of the most problematic diseases for pigs in Laos.

The kit uses minute magnetic beads coated with specific antibodies that capture CSF antigen found in fresh samples of CSF-infected pigs. During the subsequent reaction a detector-antibody binds to the captured antigen. A colour change (through an enzyme-substrate reaction) indicates a positive result.

A technique, called the immuno-magnetic bead Enzyme-Linked ImmunoSorbent Assay (IMB-ELISA), was developed as one of five key objectives of an ACIAR-funded project, which aimed to better manage CSF and foot-and-mouth disease (FMD) at the village level in Laos.

The three-year project, scheduled to conclude at the end of 2006, was developed by Dr Laurence Gleeson following an earlier ACIAR-funded project that identified CSF as a major disease concern in livestock production.

The current project, headed by CSIRO Livestock Industries' Dr Axel Colling, involves the University of Melbourne in Australia and the International Centre for Tropical Agriculture and the Department of Livestock and Fisheries, both in Laos.

Dr Colling says establishing a rapid diagnostic test for CSF and FMD is an important advance in the control of these diseases. "There is not an efficient way to test for outbreaks," he says. "Specimens must be transported out of the local villages and to a central laboratory, and then subjected to extensive tests that rely on high-tech equipment before confirming a positive diagnosis.

"This process can take several days, during which time the disease can rapidly spread."

A village pig farm in Laos: rapid diagnosis can help to control disease.

Unlike the traditional ELISA, which requires the use of expensive laboratory-based equipment, the IMB-ELISA can be carried out in small tubes using a hand-held magnet, with a colour change visible to the naked eye.

"The IMB-ELISA is easy to perform and robust, making it an ideal system for rapid diagnostics at the village level," Dr Colling says.

Initial validation results are promising, with the test scoring high for sensitivity and repeatability when performed by different operators within the same laboratory. The test is now being assessed for uniformity when carried out by many testers at different laboratories.

In addition to developing a rapid diagnostic kit, the project set out to establish and validate a vaccine program using a locally produced CSF vaccine and to assess the program's effectiveness.

After identifying logistical problems with vaccine validation, researchers have devoted considerable effort to optimising the quality-control aspects of administering the vaccine and its storage. With the optimal storage and delivery conditions now worked out, scientists are progressing to the next phase of evaluating the effectiveness of the vaccine program.

The project also aimed to track the disease occurrences and outcomes of CSF and FMD within the villages to gain an epidemiological perspective of the effects of these diseases on livestock.

"During the project many samples taken from CSF and FMD cases have been collected, identifying types of outbreaks," Dr Colling says. "The information that we have collected on the number and types of outbreaks is now being used in reports by the Department of Livestock and Fisheries."

As part of the final project objective, the research team has organised a workshop to highlight project findings and assess how best to proceed with the research on CSF and FMD. An integral part of the workshop will be training laboratory staff and field veterinary workers on using the IMB-ELISA and practical aspects of improved pig production.