



# Outflanking the Laotian rice thieves

CSIRO scientists' research on mouse plagues in the Australian wheat belt is helping farmers in Asia reduce rice losses and other damage from local rodents. Their cunning trap barrier system is not only cheap, simple and deadly, it also greatly reduces the environmental impacts of rodenticide. **Robin Taylor** reports.

The impact of a rodent plague can be devastating. For example, a 1993 mouse plague in southern Australia cost an estimated A\$100 million in crop, stored grain and other losses.

In South-East Asia, it is common for villages to lose more than half their rice crop to rats. Sometimes whole crops are destroyed when rat numbers explode, or farmers don't even bother to plant, expecting that rats will eat the crop. As well as eating the crop, rats also eat young chickens and spoil grain.

CSIRO researchers have been studying mouse plagues in Australia since 1983, identifying the factors that trigger these events and how mice use different habitats at different stages leading up to a plague. This knowledge of mouse ecology now helps in managing outbreaks.

For the past 10 years, the CSIRO group has also worked on projects funded by the Australian Centre for International Agricultural Research (ACIAR) in South-East Asia. These projects have focused on identifying the rat species causing crop losses and developing integrated control programs appropriate to each locality.

South-East Asia has more than 418 species of rodents. Of these, 65 species are known to cause significant damage to crops. While three of these species are a threat to crops in Laos, the main culprit is the Black Rat, *Rattus rattus*.

## Social differences in control strategies

Of 240 farmers from 12 villages surveyed at the start of the project, 233 said rodents were their main pest problem and caused most damage to rice and corn.

However, most of these farmers applied control methods after crop damage was apparent, rather than taking preventive action. Popular methods included trapping and hunting; cleaning up of weeds and other potential food sources and cover; cats; fumigation; and chemical rodenticides.

'One of the major differences between managing rodents in Australia and in Asia is the issue of scale,' says leader of the ACIAR projects, Dr Peter Brown.

'For example, in Australia, one farmer may manage thousands of hectares so it is easy to apply management over large areas, whereas in Laos and other

**Rats are a major pest in South-East Asia, causing crop losses, grain contamination and even eating young chickens.** CSIRO





A barrier of plastic sheeting is erected around a village grain store. Holes in the plastic lead to traps inside the barrier. CSIRO



Dr Bounneuang Douangboupha, Deputy Director of the Northern Agriculture Research Centre in Laos, and Dr Peter Brown. Robin Taylor

South-East Asian countries, one farmer has only one or two hectares.

‘We need to get more than 100 farmers or entire villages to work together in order to manage rodents at a sufficiently large scale. There is little point in controlling rats on one farm if all the neighbours do nothing.’

This adds an extra social dimension to working with farmers in Asia compared to Australia.

The initial survey showed that, while most farmers carried out rodent control individually, they recognised the benefit of working together. This was something the project enabled them to do.

### Minimising ‘collateral damage’

Encouraging natural predators is an important part of any control program, says Dr Brown.

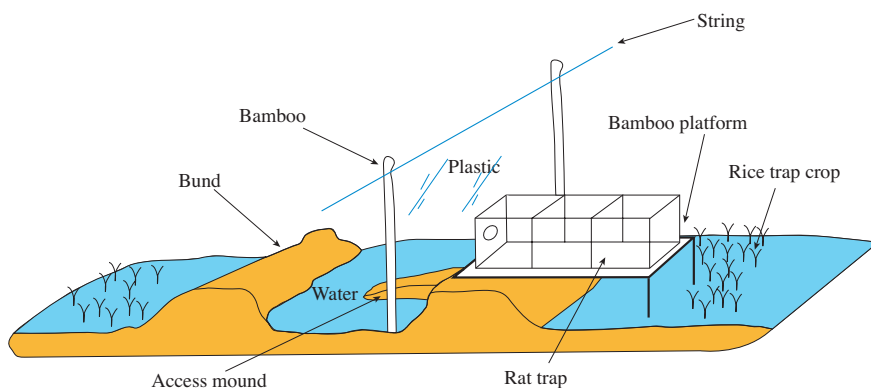
‘In Myanmar (Burma), farmers introduced poison to control rats but the problem got worse because they also killed the natural predators.’

Most of the Laotian farmers used rodenticides as a last resort, as they thought chemicals were not safe. A Luang Prabang farmer reported that he had seen a

decrease in the number of birds and snakes since applying rodenticide.

The ACIAR project aimed to educate locals about alternatives to rodenticide and involved about 50 farmers and extension workers, with control sites established in the fields and in villages.

**Below: The trap barrier system uses cheap and environmentally friendly materials to lure rats across a moat into the trap cage.** CSIRO



The plastic trap barrier system surrounds an advance ‘catch’ crop that attracts local rat thieves without harming other beneficial animals. CSIRO



The researchers introduced farmers to a control method known as the trap barrier system, involving erection of a plastic-sheet barrier around a small area of early planted crop. This early crop acts as a lure, allowing farmers to trap the rats before the main crops start to mature.

The trap barrier system and improved understanding of rodent population dynamics had already significantly reduced crop losses in Indonesia and Vietnam.

By planting several lure crops and using other measures – such as controlled baiting and trapping near rodent habitats and erecting trap barrier systems around grain storage areas – the Laotian villagers have been able to significantly reduce rat numbers and crop losses.

A farmer from the village of Hadsoua near Luang Prabang says before he put a trap barrier around his grain store, he had used cats to control rats, but the cats had not been very effective as he still lost a lot of grain.

### Integrated approach bringing results

Dr Brown points out, however, that while the trap barrier system has been successful in lowland irrigated cropping systems, in upland areas where farmers only grow one crop a year, the cost is often prohibitive for poor farmers. Further, lure crops cannot be planted early in the rain-fed upland crop cycle.

As a result, other simple solutions such as trapping rats in baited holes are being adopted.

Metal traps are simple and effective devices. People in the participating villages have learned to make traps and can continue using them in future. Children often have charge of several traps and the rats they catch are used for food. One farmer in Xiengnguen District (Luang Prabang) reported catching 3732 rats!

Another successful approach has been getting an entire village to work together for one day to hunt rats and destroy burrows and nesting sites at critical times.

‘This brings the community together to work on an important problem,’ says Dr Brown. ‘At the same time

they learn about where the rats are nesting and digging burrows.’

Using a combination of methods recommended by researchers, the farmers involved with the project have been able to reduce rat numbers and chemical use, including rodenticide. They also commented that crop yields had significantly increased, from 1 tonne per hectare (t/ha) to 1.5–2 t/ha.

Laos is one of the world’s poorest countries, with one-third of its population living below the poverty line. Even a small increase in crop yield can help increase household food security and ultimately enhance the livelihood of farmers.

‘If we can reduce damage by half, it would make a huge difference to these poor farmers as it would mean much more rice,’ says Dr Bounneuang Douangboupouha, Deputy Director of the Northern Agriculture Research Centre in Laos.

### Tackling other crop yield issues

The next phase of the program will be extending the integrated rat-control approach to other villages across Laos.

This will be achieved through the involvement of provincial extension officers and World Vision staff, who are already involved in reporting the results of the farmer survey back to participants, using the meetings as a forum to discuss alternative rat control options.

Future work will be aimed at integrating the results of the rodent management project with weed, water and nutrient management options to increase productivity in upland and lowland rice systems.

**Top left and right: The day’s catch from a farm in West Java, Indonesia.** CSIRO

**Left: The project enabled farmers to work together. Here, two farmers discuss trap design.** Robin Taylor

#### Contact:

Dr Peter Brown, (02) 6242 1562, peter.brown@csiro.au

#### More information:

CSIRO Sustainable Ecosystems’ Rodent Management Program: <http://www.cse.csiro.au/research/tropical/rodents>