Ecologists spring a trap for rice-loving rats

Anh Nguyen

CSIRO scientists have long known of the link between rodent breeding and rice cropping, especially in countries where rice is a staple. Now, they have used this understanding to develop an ecologically based management approach for keeping rats at bay – an approach that eliminates the use of costly baits and poisons.

Rice farmers in South-East Asia will tell you, without hesitation, that rats are public enemy number one. Because are fast breeders, notoriously difficult to control, clever and highly adaptable (see our recent ECOS article), they destroy crops before farmers get a chance to harvest them.

In Asia alone, the rice lost to rodent pests could feed about 200 million people each year. Rats also carry serious human diseases, so their proximity to the human environment is a major health concern.

There has been no shortage of ideas in the war against rats in South-East Asia. Fumigation, electrocution, zapper traps, glue boards, baits and poisons have all been tried, but with little success. Fast-acting rat poisons, for example, are only
effective in the short-term; when rats see their effect on fellow rodents, they will try to avoid these products. Rats are also more cautious than mice when approaching new objects or surroundings.

Natural rodent predators, such as snakes and birds of prey, have been released in or near some rice fields. Villagers also often keep cats to kill rats that threaten grain-storage areas. Predators are not without their problems, though: they can kill non-target animals, and also pose a further risk to human health and the environment.

In an attempt to starve the rats, some farmers have even avoided planting a crop, creating an extended fallow period. As the farmers discovered, however, hungry rats do not breed but simply migrate to more bountiful locations. The rats return the moment the fallow fields are replanted.

So what can rice farmers do?

Rodent ecologist Dr Peter Brown and his CSIRO colleagues have used their knowledge of rodent behaviour and reproduction to come up with a new way to keep rats at bay. They have implemented an ecologically based rodent management approach (EBRM), funded by the Australian Centre for International Agricultural Research (ACIAR).
implementation in parts of Indonesia – Karawang district, West Java, and the Pinrang district in South Sulawesi.

The Indonesian villages that practised EBRM had a mean increase in rice yield of six per cent. In Vietnam, while crop production levels were largely unchanged, rat control costs were reduced. Both countries substantially reduced rodenticide use in villages practising EBRM.3

Credit: Peter Brown/CSIRO

A key EBRM practice is establishing baited community trap-barrier systems (CTBS) that lure rats into a small area planted before the main crop. The trap crop is surrounded by a barrier interspersed with trapping cages. As the lure crop ripens, rats find themselves steered into the cages of the barrier fence as they attempt to reach the crop.

Dr Brown explains that the community trap-barrier systems method works best when adopted by an entire farming community, where rat densities and crop losses in surrounding areas are high.

‘Benefit–cost analyses indicated that losses would have to be greater than 30 per cent for the CTBS method to be cost-effective on a regular basis,’ he adds.

The success of the most recent ACIAR project based in Indonesia and Vietnam was largely due to the cooperation between farm communities and the coordination of control activities. This was supported by training in preventative approaches before the rats surged in numbers. For farmers within these communities, the shared benefits of CTBS systems outweigh the shared costs, including labour and maintenance.

‘Since 2006, 17 000 farmers have been trained in Vietnam and 20 000 farmers trained in Indonesia to implement EBRM,’ says Dr Brown.

‘Initially, it was challenging to convince communities to work together when the rat population was fairly low. However, once we helped mobilise them into collective action, they enjoyed working together to share their knowledge and outsmart the rats.’4

Dr Brown adds that further research is required to implement these EBRM strategies across affected regions in Asia – including scaling them up to ensure effectiveness at a broader scale.5
Credit: Peter Brown/CSIRO

1 Rat traps breeding cycles (2006)
2 Australian Centre for International Agricultural Research

From ECOS online [http://www.ecosmagazine.com/?paper=EC12380](http://www.ecosmagazine.com/?paper=EC12380)