

Clever enemy could control invasive plant pest

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Himalayan balsam, an invasive pink weed that spreads prolifically by water.

An Indian fungus could soon help stop the spread of the damaging alien species Himalayan balsam.

Museum botanist Dr Mark Spencer, who has advised the Government on its invasive [species](#) policy, said he is hopeful that the use of the rust, a type of fungus, will soon be licensed to control the aggressive non-native pest Himalayan balsam, *Impatiens glandulifera*.

Himalayan balsam, ring-necked parakeets and Japanese knotweed top the UK list of problematic invasive species, along with American mink and Canada geese.

Expensive guests

The GB non-native species secretariat estimates the cost to the UK of controlling invasive non-native species (INNS) at £1.7bn annually. It also estimates that the growth in world trade and global tourism, as well as climate change, mean the number of INNS will continue to grow.

In April, in recognition of the threat to European biodiversity of [invasive species](#), Parliament backed European Union (EU) measures to prevent [alien species](#) getting into the EU and to limit damage caused by those that do.

Himalayan balsam, a relative of the busy Lizzie, was introduced into the UK by the Victorians in the early 19th century as an ornamental garden plant. It has since spread aggressively out of gardens onto river banks and wasteland, particularly in the north and west of the country.

It is considered a threat because it smothers vegetation and out-competes native plants. It also adds to risk of flooding by clogging waterways.

Like most introduced plant species, Himalayan balsam arrived in the UK without any of the natural enemies that control its spread in its native habitat at the foothills of the Himalayas, in India and Pakistan.

Biocontrol is a system of introducing a natural enemy of a pest species, such as a virus, bacteria, insect or predator, to attack and limit a species, but not eradicate it.

Specialist required

Dr Spencer, who has been working with the inter-government organisation CABI to advise The Department for Environment, Food and Rural Affairs (Defra), said that the challenge is to find a highly specialised organism that only attacks one host and not its close relatives.

The rust, a *Puccinia* species, works by infecting the stem and leaves of Himalayan balsam throughout the growing season.

'It's a long and complicated process not only to identify a suitable pathogen, in this instance in India, but then to transport it back to the UK, study its growth in a controlled environment here, learn more about its biology, and then test its introduction onto the plant, again in a controlled environment,' Dr Spencer said.

'Only after long-term testing that it won't adversely affect native species, horticultural or crop plants does it progress onto being tried in the field.

The first biocontrol licence issued in the UK in 2010 was for a specialist insect, *Aphalara itadori*, to control the plant Japanese knotweed. So far, the insect's activity has had no detrimental impact on native plants or insects.

UK first and second

A licence to use the rust to control Himalayan balsam would only be the second issued in the UK. Concerned stakeholders, such as environment agencies and the beekeeper's association have been invited to comment. The project is at the consultation stage until 16 June 2014, after which Dr Spencer hopes it will move onto the field testing phase.

So far, the rust fungus trials have proved very successful and Dr Spencer predicts it could resolve the problem of Himalayan balsam within a few years.

'People can be concerned about biological control because they consider we've played God once by introducing a non-native species and now we're advocating doing it again with another non-native organism. The underlying science is very complicated but we know it can work.

'The release of *Maravalia cryptostegiae*, another rust fungus, to control rubber vine, *Cryptostegia grandiflora*, in Australia has been a great success.'

Cane toads: how not to do it

Biocontrol is also considered controversial by some because of the disastrous effects of introducing [cane toads](#) from Hawaii into Queensland, Australia in 1935 in an attempt to control the cane beetle, a native Australian beetle that destroys sugar cane crops.

Since their release, the toad population has reached more than 200 million and is spreading across Australia, with few natural predators. The effects on the ecology include the depletion of natural species that die eating cane toads and the poisoning of pets and humans. The toads have had little impact on the cane beetles.

The release of the cane toads, however, is not comparable to current structured approaches used to decide whether an organism is suitable for release.

'A quick look at the diet of the cane toad in its home range would immediately have ruled it out because it eats pretty much anything,' Dr Spencer said.

Provided by Natural History Museum

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