

## Invasive species

## Day of the triffids

**Nobody likes an interloper. But invasive species are more benign than is generally thought—and much harder to eradicate**

**H**IMALAYAN BALSAM is a wonderful plant. It grows fast, shooting up flimsy stems that can rise ten feet high. Its pretty pink flowers are adored by bees. Best are its seeds, which explode dramatically when touched. A clump growing by a stream will keep a young child happy for half an hour.

Wonderful, too, are the men and women who gather twice a week in the Otter Valley, in south-west England, to destroy this plant. Tramping through woods and swamp, they pull it up before its seeds mature. Patrick Hamilton, their leader, declared war on balsam in 2010 and beats it back a little farther every year. It is an obsession: one morning he woke at 3am, unable to shake a vision of a monster plant.

Himalayan balsam and rhododendron in Britain; garlic mustard and kudzu in America; rats and possums in New Zealand—all are invasive species, meaning that they were introduced by humans to new places and then multiplied. All are held to be worse than the most trouble-

some native weeds and vermin, and are persecuted. Plants are pulled up, sprayed with herbicide or deliberately infected with fungus. Birds and mammals are trapped, poisoned or shot.

Despite a squeeze on budgets, the war is heating up. The European Union is poised to approve a list of 37 plant and animal species that member-states must eradicate if possible. Some, like the Asian mongoose, have caused big problems elsewhere. Others are familiar but unpopular. One is the ruddy duck, a 1940s American import whose sole crime is that it mates with rare white-headed ducks in Spain.

Before the 20th century many countries could not get enough foreign species. Europeans imported plants from Asia and the Americas: Himalayan balsam was introduced to brighten British gardens in 1839 and went wild. Colonists took familiar plants and animals with them to eat and hunt, or just to help them feel at home. America has lots of starlings today because

in the 1890s the American Acclimatisation Society tried to introduce every bird mentioned by Shakespeare (starlings appear in *Henry IV*, part I).

Attitudes changed partly for political reasons. Colonists began to treasure native species as a way of asserting a new national identity: in New Zealand gardeners began to favour native plants in the late 19th century, about the same time that Queen Victoria's head was removed from postage stamps. New Zealanders, who call themselves Kiwis after a bird that is menaced by introduced stoats, now persecute invaders with special zeal.

The scientific justification for going after interlopers is that they can harm or displace valued locals. Some munch native species to oblivion, as the Nile perch has done to cichlids in Lake Victoria. Others compete for food and space. Some are too friendly with the natives, producing fertile hybrids that dilute bloodlines. Invasive plants are especially hated because they can disrupt entire food webs. A database of villainous species managed by the International Union for Conservation of Nature lists 3,163 plants and 820 animals.

But invasive species are not held to be objectionable just because of the way they behave. They are also disliked because they are foreign and reflect human meddling. Even well-mannered ones are sometimes likened to a fifth column. Daniel Simberloff, an influential invasion biologist at the University of Tennessee, points out that they can co-exist happily with natives for years before turning rampant, perhaps prodded by another newly arrived species. He argues, therefore, that if it is possible to eradicate an introduced species this should be done on the precautionary principle—though he would pardon many species that invaded at least a century ago.

Not all biologists would go so far. But many advocate attacking invaders on tiny, remote islands, especially if these are home to species that exist nowhere else. Small islands are less biologically diverse than bigger ones, and the animals that live on them are therefore often naive. Rare birds on Gough Island have been devastated by carnivorous mice, and in Hawaii by mosquito-borne diseases.

In such places eradication is possible, though hardly easy. Macquarie Island, south of Australia, contains important bird colonies. It was invaded by rats, rabbits and cats in the 19th century (the rats jumped off ships; the rabbits were put there for food; the cats were supposed to go after the rats). By the mid-20th century rabbits were eating too much vegetation, so conservationists killed most of them with a virus. The cats, which had dined on rabbit, then went after the birds. So conservationists eradicated them. The result was a boom in rabbits and rats, and many more ►►



Clockwise from top left: a brushtail possum, kudzu, a starling, tamarisk, a Nile perch en route to somebody's dinner plate. Circled: a grey squirrel



Clockwise from top left: a little owl, a brown tree snake, lots of zebra mussels, the once-loved, now-persecuted ruddy duck. Circled: Himalayan balsam

▶ dead birds. It took seven years, ending in 2014, to wipe out all mammals.

Removing troublesome foreigners from bigger islands is far harder. A concerted campaign against brown tree snakes in Guam, which has involved dropping thousands of dead mice laced with paracetamol, a common painkiller that is lethal at high doses, out of helicopters, has failed to turn the tide. One study found that snake populations in study areas rebounded within six months of a mouse drop. Poison is dropped from helicopters in New Zealand, too—again without decisive effect on the rats, possums and stoats that eat birds there. Kill some mammals and the survivors benefit from reduced competition for food and nesting places. Besides, mammals learn to avoid poison. “They’re crafty little buggers,” says Jamie Steer, an expert on biodiversity at the Greater Wellington Regional Council.

Just how crafty is shown by an unintentionally comic experiment. In 2004 a Norway rat was brought to Motuhoropapa, a small New Zealand island, and released on the beach. The researchers gave it a few weeks to settle in, then tried to kill it. First they set dozens of traps baited with main courses and desserts. Salami, salmon, peanut butter, chocolate: the rat ignored them all. The researchers then laid poison, and finally sent dogs after the creature. It vanished. It was eventually tracked to another island, 400 metres away across open wa-

ter. Finally, after 18 weeks, it walked into a trap and was killed. And this rat was at a disadvantage, because the researchers had fitted it with a radio-tracking collar.

Mr Simberloff predicts that eradicating invasive species will become easier. Advances in genetics make it possible to design creatures that produce only male offspring, or are more vulnerable to poison. In theory, a harmful gene could be spread through an entire population, making it easy to exterminate. Before firing such extraordinary weapons, though, it is worth asking whether it would be a good idea.

Mark Davis, a biologist at Macalester College in Minnesota, thinks most eradica-

tion campaigns are misguided. Some invasive species turn out to be benign, he says. Tamarisk, a tough plant that Americans have tried to eradicate for more than 70 years, turns out to be the favoured nesting site of the southwestern willow flycatcher, an endangered bird. Mr Davis’s research on garlic mustard, a loathed invader in the Midwest, suggests that it does not crowd out the natives to any great extent.

That is also true of invasive plants in Britain. Chris Thomas, a biologist at the University of York, has calculated that of the country’s 677 most widespread plant species, 68 were introduced by humans before 1500 and another 56 after that date. Not one of these introduced species ranks among the 50 most widespread plants in the country (see chart). Himalayan balsam is so rare that it barely even makes the list.

When foreign species spread quickly, it can be a sign of underlying problems. Zebra mussels, natives of the Caspian Sea that were probably brought to America in ballast water, may have swept through Midwestern lakes and rivers partly because they can tolerate higher levels of pollution than other species. They can grow so densely that they clog water-intake pipes for power stations. Other invaders thrive where few natives can: a good place to spot invasive plants is in railway sidings and along motorway verges.

Sometimes newcomers become less troublesome without conservationists intervening. In the mid-19th century European rivers were thick with Canadian waterweed. Rowing was impossible; at least one swimmer was said to have become entangled and drowned. The plant then suddenly declined; nobody is sure why. The poisonous cane toads now hopping across Australia have killed many predators, especially crocodiles. But some species have learned to avoid them, or to munch around their poisonous glands.

And natives can evolve quickly in response to new threats. Some Australian snakes have developed smaller heads, which make it harder to eat the lethal toads and therefore more likely that the snakes will survive. In America, it took mussels less than 15 years to gain thicker shells that invading Asian crabs could not crack.

Perhaps the most rapid evolution can be in attitudes. The little owl, introduced to Britain in the 1870s, was once loathed; these days some fret about its decline. Many birders were dubious about the British government’s campaign to eradicate the ruddy duck, even though it was endorsed by the Royal Society for the Protection of Birds. “A total nonsense,” says Lee Evans, a champion birder, who points out that hybridisation among birds is normal. To thwart the marksmen, many birders stopped recording sightings of the duck. The last breeding pair was shot earlier this year. But the species might come back. ■

