

Undesirable aliens

There are more than 400 exotic species in the Netherlands – and still counting. They range from old friends such as the muskrat to newcomers such as the western conifer seed bug. Steps are taken to stop the advance of some species, while others are left alone. That decision is supported by research.

TEXT NIENKE BEINTEMA ILLUSTRATIONS STEFFIE PADMOS

I. PSITTACULA KRAMERI
ring-necked parakeet



It looks like a fox but it clearly isn't one. A stockier build, a comparatively dark back and then those almost comical sideburns – like those of the coyote that is always chasing Roadrunner. Not a fox, then, but a Eurasian golden jackal. It was snapped in February by a hidden camera placed on the Veluwe heathland by Alterra and Wageningen University, both part of Wageningen UR. It was a chance sighting with a camera that was there to record the distribution of red deer and wild boar. But this particular bycatch was interesting: apparently there is a golden jackal wandering around the Veluwe. A stranger to the Dutch fauna. It might have come under its own steam from Greece or the Balkans – no one knows.

'In the Netherlands we are very keen on knowing which new animal species are coming in,' says Hugh Jansman, animal ecologist at Alterra. 'A lot of people assume that our species diversity is static, but of course that is not true at all. The distribution of populations changes all

the time. It worries us when species disappear. But it can be worrying when new species come in as well.'

RISK ANALYSES

He is not talking about species that head in this direction of their own accord, like the great egret, the lynx, the wolf and perhaps now the golden jackal. These are species which people - ecologists at least – see as a nice addition to the country's fauna. No, he is referring to exotic species brought in through human activity (see box: A Matter of Definition). 'We are less happy about those species because they can cause damage,' he says. 'Damage to our health or our economy, and even to our biodiversity.'



II. CORVUS MONEDULA

jackdaw

‘People don’t want to see cute animals being wiped out’

One of the best-known examples is the muskrat. Originally from North America and brought in to Europe because of its attractive fur, it is now widespread and seen as vermin. Because it undermines dykes, hundreds of muskrat catchers are employed continuously in the Netherlands in pest control efforts that cost the country about 30 million euros a year. Taking all the exotic species together, the pest control costs are as much as one to three billion per year, depending on whether you include exotic pathogens such as viruses in the statistics. Alterra is conducting research on exotic species for the Dutch national and provincial authorities and for the water boards. The research is mainly risk analyses, says Jansman. ‘It is policy support research addressing specific questions about the effects a particular exotic species can have and the measures you can put in place to do something about it.’

HERE TO STAY

Alterra has published risk analyses for the raccoon, the Sika deer, exotic turtles, snakes and invertebrates. ‘These risk assessments are largely based on literature studies,’ says Fabrice Ottburg, another member of the Animal Ecology Team at Alterra. He collaborated on the reports on turtles and snakes, as well as studying exotic crayfish and fish. ‘First of all you describe the species’

natural habitat,’ he explains, ‘and to what extent conditions in the Netherlands fall within that range, both now and in various climate scenarios. You study what the species eats, and to what extent that could make it a competitor or predator of indigenous species. And you describe other characteristics such as whether the species can cross-breed with indigenous species and pass on diseases. And whether it is flexible and reproduces fast.’

Ideally, Ottburg likes to see this kind of risk assessment being done in the early stages, even before an animal actually turns up in the Netherlands. ‘If it looks as though the species could pose a risk,’ he says, ‘then you can sometimes take preventive measures – or intervene as soon as it appears, as was done with the house crow in Hoek van Holland. Then it doesn’t get the chance to become invasive.’

Invasive means the species spreads fast and poses a threat to other animal and plant species. Take American crayfish for example. They were imported at some point for consumption purposes and for fishponds. They then escaped or were deliberately released into the wild. ‘They devour everything,’ says Ottburg. ‘They can decimate populations of amphibians and invertebrates at incredible speed. They are here to stay now, with five related species inhabiting most inland waters in the Netherlands. We’ll never get rid of them.’

MOST EFFECTIVE

Sander Smolders of the risk analysis office (BuRO) at the Netherlands Food and Consumer Product Safety Authority (NVWA), which comes under the ministry of Economic Affairs, is pleased to see such risk assessments. ‘On the basis of these we can decide what we are best off focusing on,’ he says, ‘namely prevention, early

EXOTIC SPECIES IN THE NETHERLANDS

The Dutch Species Catalogue is the national database of organisms (both native and exotic) found in the Netherlands. The Species Catalogue is managed by Naturalis and EIS-Nederland (the Dutch branch of the European Invertebrate Survey) with collaboration from specialists from the Mammal Society, the reptile research association RAVON and

the bird research association Sovon. The initiators of the Species Catalogue have been working for the ministry of Economic Affairs since 2009 on a list of exotic animal species in the Netherlands. The first phase of this project has been completed but the list is continuously being updated. Currently 925 of the 35,378 species in the country have been identified

as exotic, including 420 animals. These are only the species which have managed to thrive in the country for longer than 10 years, so the real number is somewhat higher. There are for example four species of squirrel on the list at the moment, whereas the Mammal Society says there are now eight new species in the Netherlands which are successfully reproducing.

Comes from: North American
In the Netherlands since: 1970
Numbers: very big local populations
Damage: Damage banks, prey on amphibians



III. PROCAMBARUS CLARKII
red crayfish

IV. ONDATRA ZIBETHICUS

musk rat

Comes from: North America
In the Netherlands since: released for fur hunting early 20th century
Numbers: from high tens of thousands to hundreds of thousands
Damage: damage dykes



V. CORVUS SPLENDENS
house crow

Comes from: South Asia
In the Netherlands since: 1994
Numbers: a few tens
Damage: none yet – cause nuisance and harm crops and brooding birds in other European countries

detection and elimination or, if it's too late for that, managing the invasive species'. He agrees that prevention is the most effective approach. But the government only considers intervening if an exotic species is causing damage, or could do so, and if a set of measures is really feasible. 'But the majority of exotic species are not invasive, so the government doesn't want to spend public money on them.'

No active control measures are taken, for instance, against species such as the Egyptian goose and the ring-necked parakeet, because they do no damage. Alterra's recent risk assessment on the raccoon showed that this is probably true of this species too. But there are a few other species that are risky, such as Pallas's squirrel (which competes with the indigenous squirrel), the muskrat (which undermines dykes), the North

America bullfrog (which can decimate invertebrates and amphibians) and the ruddy duck (which cross-breeds with the endangered white-headed duck).

Partly as a result of the Alterra reports, the sale of non-indigenous turtles and the importation of crayfish are now restricted. 'It is impossible, both practically and cost-wise, to prevent all the damage by exotic species,' says Smolders. 'So we must set priorities. And one priority is to prevent the introduction of problem species in the Wadden Sea via shellfish transportation by mussel fishers. So together with the sector we established a specific policy on this in 2013.'

If Ottburg had his way, the government would increase its efforts on the prevention front.

By further controlling the trade in exotic animal species, for instance. 'That has been done for the American crayfish, but I still frequently see them for sale in garden centres. And the same goes for the pond perch, which is at least as voracious. If you ask me, enforcement could be given more priority.'

CROSS-BREEDING

But sometimes legislation becomes less stringent instead. The old Flora and Fauna Act only allowed falcons to use indigenous species for hunting and pest control. Once the new Nature Act comes into force in June, however, a whole list of new exotic birds will be permitted, including the Saker falcon and the gyrfalcon. They could hybridize with the indigenous peregrine falcon. This is often even organized deliberately because such hybrids can have a particular combination of characteristics that are desirable for falconry. But they often escape too, and reproduce in the wild.



A QUESTION OF DEFINITION

Exotic species, also known as alien or introduced species, are animals, plants, fungi or micro-organisms imported through human activity into an area where they do not originally occur, but where they proceed to thrive. Species which were introduced to the Netherlands before the year 1500, such as the rabbit, the pheasant and the mute swan, do not count and are considered indigenous. Exotic species are sometimes introduced deliberately. An example is the multicoloured Asian ladybird, released in Europe 20 years ago to combat aphids. Pheasants and fallow deer were once released as hunting game. And every year hundreds of turtles and pond perch are released into Dutch watercourses when their owners have had enough of them.

But a lot of species get introduced by accident too. Sometimes pets or ornamental animals escape from captivity, as did the Egyptian goose, the Pallas's squirrel and the Italian crested newt. Marine creatures such as the Chinese mitten crab are brought in with ballast water from ships; the tiger mosquito hitches a ride on tropical plants. And since a canal was dug between the Rhine and Danube 20 years ago, fish species from the Danube watershed, such as the round goby and the money goby, have been able to reach our waters.

Another category of newcomers do not get classed as exotic species: these include species such as the great egret, whose habitat is shifting as a result of climate change. These species fall into the same category as the lynx, the wild cat, the wolf and perhaps now the golden jackal: animals that establish themselves here of their own accord.

Alterra published a risk assessment about this at the behest of the ministry of Economic Affairs. 'Of course it is debatable how bad hybridization is,' says Alterra ecologist and geneticist Arjen de Groot. 'On balance we think it is bad, especially where threatened indigenous species are concerned.' One example is the indigenous northern crested newt, of which in certain parts of the Veluwe you now only find hybrids, crossed with the exotic Italian crested newt.

Hybridization also takes place between the Sika deer and our indigenous red deer, between the once imported carp and the indigenous crucian carp, and between the domestic cat and the wild cat – a natural newcomer that we welcome with open arms. 'For many species we don't really know exactly what the risks of hybridization are,' says De Groot, 'nor what percentage of the population is already hybrid. It would be good to systematically investigate under what conditions hybridization endangers the survival of a species or population.'

Smolders at BuRO/ NVWA would be happy to see Alterra addressing these kinds of research programmes and certainly not limiting itself to risk analyses. 'Besides demand-driven research, it's also essential that Wageningen UR continues to do its own more fundamental research,' he says. 'Another important research question is: what makes exotic species invasive and how can we predict that more accurately? As well as the question: how can we make ecosystems more resilient to the negative impact of exotic species? If we can answer these questions satisfactorily, we can improve



VII. LEPTOGLOSSUS OCCIDENTALIS

Western conifer seed bug

Comes from: North America

In the Netherlands since: 2007

Numbers: from 1 in 2007 to several hundred in 2015

Damage: negligible



VI. TRITURUS CARNIFEX
Italian crested newt

Comes from: the Alps

In the Netherlands since: first reported in 1999

Numbers: c. 35 populations on the Veluwe

Damage: Competition and hybridization with indigenous crested newt

both the prevention and the management of invasive exotic species.'

CUTE FACTOR

Management often means active control. In the case of the American crayfish, there is not much point in that anymore, says Ottburg. But it is different for other species. A few populations of the American bullfrog were eliminated in 2011, for instance, and of the Pallas's squirrel in 2013. In Great Britain the ruddy duck that came in from America has been almost completely eliminated. This duck hybridizes with the endangered European white-headed duck. Sadly, that is not the end of the story, because the ruddy duck inhabits other parts of western Europe too, and not all countries make the same efforts to control it.

And that is not just a matter of money or priorities, says Ottburg. 'People are cautious about wiping out populations, especially of cute animals.' He gives the example of the fallow deer that live in the Amsterdam Water Supply Dunes. 'There are more than 4500 deer there, stripping it bare. Trees and shrubs can't rejuvenate anymore, flowers are disappearing and with them butterflies, sand lizards and brooding birds. Yet the squabbling about a possible cull has been going on and on.' The same goes for the culling of house crows in Hoek van Holland. Critics think the species does no harm at all.

Hugh Jansman too points to the aversion to killing animals with a high cute factor, both among the general public and among policymakers. 'There is more and more resistance even to the culling of muskrats.' In this case, he has his own doubts too. 'Not because I think they're so sweet but because the method of killing them is not very humane, and there is a lot of bycatch in the traps too. The decline of the stoat may very well be related to this.'

FEWER TRAPS

He speculates as to whether the current policy on numbers trapped actually has the effect of keeping the population at the level at which it reproduces optimally, as is the case with the deer and wild boar on the Veluwe. In other words: if we were to catch fewer of them, the population might naturally stabilize at an acceptable level. Something like this happened in Poland. 'People stopped the muskrat control there, after which the population collapsed,' says Jansman. 'It is not clear why: possibly due to an infection. There needs to be a thorough study of what would happen in the Netherlands if we stopped.' And what about our protection

**'Enforcement could
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from flooding meanwhile? 'Preventive measures could be thought up to cater for that,' says the researcher. 'Grates in the dykes, for instance.'

And the golden jackal – are we going to find out whether it counts as an invasive species or as a natural new arrival? 'There haven't been any questions in parliament about it yet,' Jansman laughs. 'So Alterra hasn't received a direct request to investigate it.' But of course he is extremely curious – so he is doing his best to get hold of some DNA material, from faeces for instance. 'We are mobilizing as many people as we can. So who knows?' ■

www.wageningenur.nl/exotics

DNA GIVES AWAY PRESENCE

Alterra Wageningen UR is developing new analysis methods to help other organizations with the monitoring of exotic species. One example is the environmental DNA (eDNA) method. This entails proving the presence of animals on the basis of their DNA in water, soil or even air – so without having to see or capture them. 'You prove the presence of fragments of DNA, particularly skin cells and faeces, which are characteristic for the species in question,' says ecologist and geneticist Arjen de Groot.

Alterra has already developed eDNA tests for various exotic species, including the American signal crayfish and the round goby. These are already being used in a few places. 'The very latest development,' says De Groot, 'is that eDNA is also being used to identify diseases in water. Like the crayfish plague brought by American crayfish, for instance. It doesn't make them ill, but it does make the European crayfish ill. Or the Ranavirus and the chytrid fungus in frogs.'

De Groot hopes the eDNA technique can eventually be used to test whether and where water is infected, even after the possible elimination of the exotic species carrying the disease. 'But then you do have to know how long viruses and fungi have been in evidence in the water,' he says. 'We still want to work on that.'