

Alien species

Alien species - some questions

- What are "Alien species"?
- How did they arrive?
- Does it matter?
- Should we be getting rid of them?

Alien species - what are they like?



Wrong type of Alien!

Nothing to do with Area 51

We are dealing with

- Plants
- Animals
- Funghi
- Bacteria, viruses and moulds

How did they get here?



Wrong type of transport!

Nothing to do with flying saucers

How are aliens arriving in the UK?

- By sea - cargo vessels; container vessels; visitors from cruise liners; ballast tank water; smuggling
- By air - airfreight; personal luggage; smuggling
- By road - foot passengers; underneath trucks; smuggling
- By post
- Through disposal of unwanted exotic pets
- Through windborne or seaborne dispersal
- As a result of climate change
- By using a legitimate import as a vector

Alien species - definition

An introduced or Alien species is a species living outside its native distributional range, which has arrived there either by human activity, either deliberate or accidental, or through the impact of global climate change.

By sea or air



By direct distribution



ebay



a



ups



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When is an alien species a problem?

When it becomes an **INVASIVE** species!

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Invasive species - definition

An invasive species is one that has been introduced and become a pest in its new location, spreading (invading) by natural means. The term is used to imply both a sense of urgency and actual or potential harm.

Top 10 Invasive Alien species

- The Signal Crayfish (*Pacifastacus leniusculus*)
- Japanese Knotweed (*Fallopia japonica*)
- Common Rhododendron (*r. Ponticum*)
- The Grey Squirrel (*Sciurus carolinensis*)
- American Mink (*Neovison vison*)
- Himalayan Balsam (*Impatiens glandulifera*)
- Floating Pennywort (*Hydrocotyle ranunculoides?*)
- Muntjac Deer (*Muntiacus reevesi*)
- Carpet Sea Squirt (*Didemnum vexillum*)
- American Skunk Cabbage (*Lysichiton americanus*)

Top 10 Invasive Alien species

How did they get here?

What is the problem?

How can we alleviate things?

Focussing on the first eight

How did they get here?

What is the problem?

How can we alleviate things?

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The Signal Crayfish

How it arrived

Introduced in 1970s by UK government from North America because native crayfish were suffering a decimating plague.

The problem

Unfortunately the Signal Crayfish is also a carrier for the plague and made things much worse by passing it on to native crayfish!

Crayfish escaped from fish farms.

This is a voracious predator – eating anything - as well as damaging river banks, causing potential flooding

These crayfish are gradually spreading from South East. Can walk overland up to 300 metres at night.

Control

Very difficult. Predated by otters and mink



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Japanese Knotweed

How it arrived

Introduced as a decorative plant by the Victorians in 1886.

The problem

This is an extremely robust plant, which can survive in the most difficult situations, even thriving on hot volcanic ash on the slopes of volcanos. The rhizomes of Japanese Knotweed are extremely vigorous and will seek out any cracks in concrete or brickwork and can then split it apart.

It is now widely established across the UK

Control and eradication

Very difficult. Physical removal of infected soil is often undertaken. Otherwise careful and extensive treatment with glyphosate is required



Japanese Knotweed

More examples



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Common Rhododendron

How it arrived

Native to Southern Europe. Introduced as an ornamental shrub in 1763 and later popularised by the Victorians

The problem

This plant is invasive and loves growing in poor acid soil. It grows quickly and to a large size, spreading laterally. It also suckers easily. The leaves contain poisonous grayanotoxins (neurotoxins) in young growth as well as poisonous nectar in the flowers. Honey derived from this plant is so-called “mad honey” because of the toxins found in it.

Each flower head can produce thousands of seeds, which may well germinate. Even after physical removal the soil is poisoned

Control and eradication

Very difficult once well established. Physical removal is best solution after extensive treatment with glyphosate



Common Rhododendron

More examples



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Grey Squirrel



How it arrived

Grey squirrels (*Sciurus carolinensis*) are native to North America and were first released in the UK in 1876 in Henbury Park, Cheshire – by the Victorians.

The problem

This enchanting little herbivore has spread throughout the UK, causing a great deal of damage to native trees - “bark ringing” - removal of a completely encircling ring of bark from a tree will kill it. The animal is also a carrier of the squirrel pox, which is frequently fatal for our native red squirrel

Control and eradication

Very difficult. At one time a 50p payment was made for each grey squirrel tail! Should we forget the red squirrel?

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American Mink



How it arrived

Mink were introduced to Great Britain in 1929 for use in fur farming but individuals began to escape from farms and breed in the wild. Well meaning activists released animals from mink farms

The problem

The mink can very happily live and breed in the UK. It thrives and preys upon fish, small wildfowl, domestic fowl and particularly our beloved Ratty – the water vole, which has suffered a 95% reduction in numbers through the 20th Century.

Control and eradication

Trapping with use of baited traps and then shooting. Take care not to trap an otter!

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Himalayan Balsam



Himalayan Balsam

Seed pods exploding



Himalayan Balsam

How it arrived

Himalayan Balsam was deliberately introduced into the UK as a decorative plant in 1839.

The problem

The plant is an annual, which grows very quickly on damp ground, particularly along the edges of watercourses. It's luxurious growth stifles all other annual growth and it has no natural predators. In the Autumn the seeds are fired explosively from the mature pods and are carried down stream to a new location. When the plant dies back it exposes an area of riverbank devoid of all vegetation, which then permits winter rains and flooding to erode the river bank

Control and eradication

Manual removal of the flower heads before the seed pods mature followed by physical removal of the plant by "pulling" is the only current solution, but is very labour intensive. There is talk of the introduction of a fungus which naturally attacks the plant, but care is needed. Remember the law of unintended consequences!



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Floating Pennywort



How it arrived

Native in North America, it originally escaped into the environment in the late 1980s as a decorative escapee from garden ponds.

The problem

This floating plant can grow up to 20 cm daily. It is very comfortable growing on our streams and rivers. It establishes dense vegetation mats that can out compete native species, dominate watercourses, obstruct boats and prevent angling and potentially increase flood risk.

Control and eradication

Manual removal, as shown opposite, where the plant is being removed from the River Thames. The intention is to clear the Thames completely in 2018. Vigilant observation is absolutely essential

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Muntjac Deer



How it arrived

We have the Duke of Bedford to thank for the introduction of the Muntjac. The Woburn park estate has some eight different species of deer, including our own red, roe and fallow deer. Some imported Muntjac escaped in 1925 and have prospered, expanding their range and numbers enormously, throughout England and into Wales.

Rumours abound that human intervention was involved in their spread to the island of Ireland.

The problem

The Muntjac punches well above it's weight in terms of destructive power. Like other deer it is no respecter of the horticultural environment. But unlike other deer, being only the height of a small dog it is adept at "hiding in the long grass".

Control and eradication

Culling as for other deer.

Alien species – the full list

15 Mammals

Red-necked wallaby from Australia
American mink
Black rat
Brown rat
Chinese water deer
Coypu from South America (subsequently eradicated)
Domestic cat from the Middle East
Edible dormouse from Europe
European rabbit from continental Europe
Grey squirrel from North America
Fallow deer from continental Europe
Feral goat
House mouse
Reeves's muntjac deer from China
Sika deer from Asia

11 Birds

Canada goose
Collared dove
Common pheasant
Golden pheasant from Asia
Rose-ringed parakeet (Kingston parakeets) from Asia
Lady Amherst's pheasant – extinct in GB since 2015
Little owl from mainland Europe
Mandarin duck from Asia
Red-legged partridge
Ruddy duck from America
Egyptian Goose from Africa

Alien species - the full list

16 Fish

Bitterling
Black bullhead
Bluegill
Common carp
Fathead minnow
Goldfish
Grass carp
Orfe
Pacific humped back salmon
Pumpkinseed
Rainbow trout
Sunbleak
Topmouth gudgeon
Walleye
Wels
Zander

27 Reptiles

Aesculapian snake
Grass snake
Common wall lizard
Western green lizard
European pond terrapin
22 species of terrapin

7 Amphibians

Alpine newt
American bullfrog (not established)
Edible frog
European tree frog
Marsh frog
Midwife toad
Yellow-bellied toad

Alien species - the full list

22 Butterflies and moths I

Large chequered skipper butterfly from continental Europe to Channel Islands (subsequently lost)

Large copper butterfly *Lycaena dispar rutilus* from Continental Europe (subsequently lost)

Large copper butterfly *Lycaena dispar batavus* from The Netherlands (subsequently lost)

Geranium bronze butterfly from South Africa via Southern Europe on geranium (not established)

Map butterfly (subsequently eradicated)

Psychoides filicivora moth from the Far East

Azalea Leaf Miner moth from East Asia

Argyresthia cupressella moth from United States

Brown house moth from Asia

Tachystola acroxantha moth from Australia

Coleotechnites piceaella moth from United States

Cotoneaster Webworm moth from United States

Blastobasis adustella moth

Blastobasis lacticlella moth

Alien species - the full list

22 Butterflies and moths II

Adoxophyes oporana moth

Carnation tortrix

Light brown apple moth Epiphyas postvittana from Australia

Codling moth

Horse-chestnut leaf miner

Box tree moth Cydalima perspectalis from east Asia

Common forest looper (Pseudocoremia suavis) a New Zealand endemic found west Cornwall in 2007, possibly not established]

Oak Processionary Moth Thaumetopoea processionea

6 Ants and beetles

Pharaoh ant from United States

Several non-endemic ant species introduced to Great Britain

Harlequin ladybird

5 Molluscs and Crustaceans

New Zealand mud snail

Spanish slug

Chinese mitten crab

Killer shrimp

Signal crayfish

Alien species - the full list

25 Plants

American willow herb

American skunk cabbage

Autumnal crocus

Bermuda buttercup

Canadian pond weed

Common Field speedwell

Epilobium brunnescens

Evening primrose

Floating pennywort

Fox and cubs

Giant hogweed

Guernsey fleabane

Himalayan balsam

Hottentot fig

Japanese knotweed

Jewel weed from Asia

Least duckweed

Leycesteria formosa

Oxford ragwort

Pigmy weed

Purple dewplant

Purple pitcher

Rhododendron

Russian vine

Water fern

Seen any of these in Surrey/Sussex?



Impact of the human vector

Unintentional introductions

An invasive species is one that has been introduced and has become a pest in its new location.

Unintentional introductions occur when species are transported by human vectors. Increasing rates of human travel are providing accelerating opportunities for species to be accidentally transported into areas in which they are not considered native. For example, **three species of rat** (the black, Norway and Polynesian) have spread to most of the world as hitchhikers on ships, and arachnids such as **scorpions and exotic spiders** are sometimes transported to areas far beyond their native range by riding in shipments of tropical fruit. There are also numerous examples of marine organisms being transported in ballast water, one being the **zebra mussel**. (invading) by natural means.

The term is used to imply both a sense of urgency and actual or potential harm.

The Law of Unintended Consequences



The Cane Toad is large and packed with poison

Don't mess with the toad!

The Cane Toad saga

Tropical Queensland in Australia is a large producer of sugar from sugar cane. (Of course the sugar cane is also an introduced species...). The growers were troubled by numerous pests, of which the most important was the cane beetle, which eats both leaves and grubs. So they released into the wild a predatory toad, which they believed would decimate the cane beetle population. It did – but it thrived, and once it had finished on the cane beetle population it was still hungry.

The March of the toad



The Cane Toad is large and packed with poison

Don't mess with the toad!

The Cane Toad saga

Cane toads are marching across Australia. Initially 101 toads were imported from a Puerto Rico – their home territory – via Hawaii. After breeding, 3,000 were released and are now marching from Queensland right through the Northern Territory – and can move at up to 60 km per annum. Estimates of numbers are difficult, but it is Australia's number one pest. Australia has a long and depressing history of inadvertently introducing wrecking ball species as pets and livestock, or for sport. Examples include foxes, pigs and rabbits, goats, camels and cats

Summary of problems caused by alien plants and animals

- Upsetting the natural food web
- Loss of habitat for natural species
- Extinction of native species
- Reduction in botanical or zoological diversity
- Loss of resources
- Poisoning the environment
- Building and highway damage
- Choking waterways
- Flooding
- Bank erosion

And that's only plants and animals!

We have yet to deal with

- Insects
- Molluscs
- Beetles
- Funghi
- Moulds
- Bacteria
- Viruses

Insects - flies, moths and butterflies

There are more than 20,000 insect species in the UK.

It is estimated that there are around 900,000 insect species worldwide

New species can arrive in the UK in several different ways.

- Borne on air currents due to the variability of wind conditions
- Northward migration due to changes in the global environment with climate change
- Carried in other vectors. Prime candidates are packaging or containers on board ships, or in the hold or undercarriage chambers of aircraft
- Inadvertent "piggy back" rides on animals, birds or humans
- Intentional smuggling
- Exotic species with legitimate or illegitimate trade

Insects - flies, moths and butterflies

Problem species of insects

Not all alien insects are problematic, but here are a few problem insects

- The harlequin ladybird
- The Asian tiger mosquito
- Oak processionary moth
- The sand fly
- Red fire ant
- Mediterranean termite
- The Saintonge termite
- Argentine ant

Insects - flies, moths and butterflies



The Harlequin ladybird

Became established in 2004, having been carried across from the USA on high winds.

- It is larger than our native
- It is extremely variable in appearance, and has a voracious appetite
- It is one of the most invasive insect species in the world
- The Harlequin doesn't stick to one type of food. Once it has finished feeding on aphids in the crops it then turns its attention to other ladybird eggs and larvae and even the eggs and caterpillars of moths and butterflies.

Insects - flies, moths and butterflies



The Asian Tiger mosquito

Coming to a house near you...very soon

The Asian Tiger mosquito is larger than our normal mosquitos

- Unlike our mosquitos, it hunts for its prey (you) during the day.
- Asian tiger mosquitoes are black with silvery white markings
- They thrive in hot weather
- They can transmit harmful diseases like Zika virus, West Nile virus, Chikungunya and dengue fever.
- Eggs and larvae from Asian Tiger mosquitos were found in SE England in 2016 and 2017

Insects - flies, moths and butterflies



The Oak Processionary Moth (OPM)

- First found in South West London in 2005, it is now spreading and has become widespread in West and South West London.
- There have also been outbreaks in East London, Hertfordshire, Berkshire and parts of Surrey
- The caterpillars move around in a head to tail procession, and the nest is always found on the bark of a tree, not in the foliage.
- Like other caterpillars, the OPM will defoliate it's host tree, but the real problem is the urticating hairs which cover the body. They are brittle and will break off, causing intense irritation. Infestations must be reported

Insects - flies, moths and butterflies



Termites

- First colony was found in the South West in 1998, it was thought to have been in a consignment of imported timber.
- Termites are wood boring insects, common in warmer parts of the World
- They feed on dead wood and can cause serious damage to structural timber.
- They are found throughout the South of France and are now well established in Paris. Colonies are moving closer to the North French coast.
- Colonies have been reported at various locations in the UK, but have always been tracked down to imported timber

