



Countryside Jobs Service

Focus on Alien Species

In association with GB Non-native Species Secretariat



2 December 2013

All over the world, people have introduced animals and plants to areas outside their native range. These are known as **non-native species**. Over the last 200 years the number of new arrivals in Britain has increased dramatically, and we now have almost 2000 established non-native species. Most are harmless and some, including wheat and other food crops, are beneficial. However, around 10-15% have become **invasive non-native species** (INNS) which spread and have a negative impact on the environment, economy, and even our health.

INNS are one of the main drivers of biodiversity loss worldwide. In Britain they have led to dramatic declines of some native species including the Water Vole, White-Clawed Crayfish and Red Squirrel. They threaten many of our key protected sites including the Pevensy Levels, home to a diverse range of native aquatic plant species; the Torbay Limestones which support 35 nationally rare, scarce and threatened plants; and the Norfolk and Suffolk Broads, Britain's largest protected wetlands.

Aside from harming wildlife and the environment, INNS cost the British economy over £1.7 billion a year, affecting a range of sectors. Agriculture and horticulture are worst affected, with combined annual costs of £1 billion. Construction, development and infrastructure account for a further £212 million; with almost 80% of this due to Japanese Knotweed, a fast growing invasive plant infamous for the damage it causes to buildings and hard standing.

In Britain the Non-native Species Strategy, launched in 2008, provides a coordinated approach to tackling INNS. It follows a three-tiered approach, originally set out in the Convention for Biological Diversity:

1 Prevention

The most effective way to reduce the impacts of INNS is to prevent them establishing in the first place. The Asian Hornet (pictured) is expected to arrive in Britain soon. If it becomes established it could have serious impacts on already threatened honeybee populations and other native pollinators, and poses a risk to human health. A contingency plan has been produced to help prevent its establishment, and any suspected sightings should be reported immediately to alertnonnative@ceh.ac.uk.



Since its accidental introduction to France in 2004, the Asian Hornet has spread to Spain, Portugal and Belgium. (Jean Haxaire)

2 Early detection and rapid response



Water Primrose grows rapidly and can cover entire water bodies, contributing to flooding (Trevor Renals)

To prevent INNS establishing, new arrivals must be detected quickly. Water Primrose (pictured), a fast growing freshwater plant, was first recorded in Britain in 1999 but has been contained to a small number of isolated populations which are actively managed by the Environment Agency and local community groups. As a result the impacts here have been minimal, while in France it is widespread and costs millions of Euros annually to control.

3 Long term management

Some INNS are already widespread in Britain. While we may not be able to eradicate these, there are control measures that can be used to reduce their impact. The American Mink was introduced in

1929 for fur farming, but following escapes and releases was common in the wild by the late 20th Century. It is a voracious predator of a variety of species including many ground nesting birds (pictured) and the native Water Vole. This has had severe negative impacts on populations, for example Water Vole sites have declined by over 90%, largely as a result of predation. While we cannot eradicate Mink from the whole of Britain, various initiatives such as the Scottish Mink Initiative¹ are attempting local control.



Mink have a significant impact on native wildlife, especially water voles, sea birds and fish. (John W Anderson)

How you can help

There are easy things that everyone can do to help reduce the impacts of INNS. A key priority is to avoid introducing or spreading INNS in the wild by using good biosecurity practice². When working in the countryside, keep to footpaths and established tracks and park vehicles on hard standing. Respect any notices or extra precautions you encounter and be aware of the potential presence of INNS. Before and after visiting a site, clean your footwear, equipment, tyres, and wheel arches. Bear in mind that waterproofs and wellingtons are easier to keep clean than a fleece and walking boots!

Check Clean Dry



INNS are a particular problem in the aquatic environment. Remember to Check, Clean and Dry³ clothing and equipment that could spread INNS when leaving the water. This includes footwear, survey gear, nets, waders, boats and trailers.

- Check for live organisms, particularly in areas that are damp or hard to inspect.
- Clean and wash everything thoroughly using clean water.
- Dry equipment and clothing as some species can live for days in damp conditions.

Record non-native species

If you see an INNS in the countryside, you should record it. This is particularly important if it is an alert species like Asian Hornet, Water Primrose, Killer Shrimp and Quagga Mussel. Records should include your name and contact details, the location and date of your sighting, and a photograph of what you saw if possible.

Upload records online through iRecord⁴ or using a smartphone app that sends its data to the National Biodiversity Network (e.g. PlantTracker⁵). Records of alert species can also be emailed directly to alertnonnative@ceh.ac.uk

Get involved in management

All over Britain local action groups are working on INNS: tackling invasive species, undertaking monitoring, and raising awareness. Find out what is going on in your area and how you can get involved by visiting the NNSS website⁶.

Where to find more information

The NNSS website provides information on all of the above and more, including:

- INNS news and events happening across Britain.
- What is happening in Britain to help tackle the problems caused by INNS.
- Fact files for over 2000 non-native species.
- Identification guides for over 60 species.
- Risk assessments for 60 species.

Links

1. Scottish Mink Initiative: www.scottishmink.org.uk
2. Biosecurity guidance: www.nonnativespecies.org/biosecurity
3. Check Clean Dry: www.nonnativespecies.org/checkcleandry
4. iRecord: www.brc.ac.uk/irecord
5. PlantTracker: planttracker.naturelocator.org
6. NNSS website: www.nonnativespecies.org

Scottish Mink Initiative

Working with Communities to Protect Native Wildlife



Scottish Mink Initiative

The Scottish Mink Initiative (SMI), now in its second phase, began in April 2011 and is currently the UK's largest initiative to date to remove breeding American mink (*Neovison vison*). The SMI area covers approximately 29,000 km², from north Tayside across Aberdeenshire, Moray, the Cairngorms and the Highlands and with the help of volunteers, aims to protect native wildlife such as water voles and ground nesting birds.

The SMI is a partnership project between Rivers and Fisheries Trusts of Scotland (RAFTS), Scottish Wildlife Trust, the University of Aberdeen, Scottish Natural Heritage (SNH) and Cairngorms National Park Authority. The Initiative builds upon the success of the North East Scotland Water Vole Project, the Cairngorm Water Vole Conservation Project and the North West Highlands Mink Control Project.

The Initiative is funded by SNH, Tubney Charitable Trust, Cairngorms National Park Authority, People's Trust for Endangered Species, the Scottish Government and the European Community Cairngorms, Highland, Moray, Rural Aberdeenshire and Rural Tayside Local Action Groups LEADER 2007-2013 Programme.

American mink were originally brought to the UK for the fur farming industry with the first farm opening in Scotland in 1938. The first American mink were recorded living in the wild the same year however it is thought these early escapees did not survive since the first confirmed record of breeding American mink in Scotland was not reported until 1962. The population we have today are descendants of the American mink who either escaped from fur farms or who were deliberately released.



Mink carrying kittiwake chick © Terje Kolaas



Mink monitoring raft © Ann-Marie MacMaster

The American mink is a very successful invasive non-native species for a number of reasons. Firstly, as a generalist predator, American mink can adapt their feeding behaviour according to the prey species available and once a given food source is exhausted, they can simply switch to another. American mink will prey upon rodents, rabbits, game birds, domestic fowl, eggs, fish and even guinea pigs if their run is not secure! Secondly, American mink are prolific breeders and can have up to 10 kits a year although the average is 4-6. Furthermore, American mink do not have predators that consistently predate them although they will occasionally be taken by raptors and large mammalian predators.

The SMI use modified mink rafts designed by the Game and Wildlife Conservation Trust (GWCT) to monitor for and trap American mink. The mink rafts float on rivers, lochs and burns and are monitored by volunteers who regularly check the clay pad for footprints. Once mink prints have been identified a live capture trap can be set within the tunnel. There is a legal requirement for traps to be checked every 24 hours.

Volunteers are involved at a number of levels: monitoring a mink raft(s) weekly for footprints and submitting their findings through the Minkapp; and/or setting and checking traps; and/or carrying out dispatch. We also rely on volunteers to tell us when they see a mink and their sightings can be reported here: <http://bit.ly/MinkSighting>. SMI has achieved considerable success in recruiting individuals and land managers to undertake voluntary mink control and the Initiative simply could not function without these

volunteers. To pay trappers to work across this large geographical area would require extensive costs which would not be sustainable in the long-term.

Phase 1 of SMI (April 2011 – August 2013) involved 4 Mink Control Officers coordinating volunteer effort and raft networks across the Initiative area. Due to the increasingly difficulty to source funding, a more sustainable option had to be found to take Phase 2 forward. From September 2013, Mink Control Officers are no longer employed and the local fisheries trusts across the SMI area have taken on the mink management work in their respective areas. Fisheries trusts can provide equipment to volunteers on long term loan together with support and advice, just as the Mink Control Officers did.



Mink prints on clay pad © Ann-Marie MacMaster

The Scottish Mink Initiative retains mink carcasses in the deep freeze so that they can be used by the University of Aberdeen for research purposes, including stomach content and DNA analysis. It was discovered that some juvenile males are trapped ~50 km from other direct relatives, indicating that they had travelled this distance during their first year. These results show that working on a multi-catchment scale is essential if we are serious about removing breeding American mink.



Trapped American mink © Jamie Urquhart

There are currently more than 550 volunteers monitoring 983 mink rafts across the SMI area and since April 2011, 489 American mink have been removed. In spite of these impressive numbers, there is always room for more volunteers so if you live or work within the Initiative area and would like to get involved, please go to our website for more details, including how to contact the relevant fisheries trust for your area: www.scottishmink.org.uk

Ann-Marie MacMaster (Scottish Mink Initiative Coordinator)

Surrey's Invasive Species Month.

By Frances Halstead, SWT Environmental Groups Officer



Mountain of HB removed from Sayes Court Nature Reserve in Runnymede (Surrey WT)

This Summer Surrey Wildlife Trust (SWT) helped to co-ordinate the work of 15 partner organisations and voluntary groups in the Wey and Mole river catchments to remove Himalayan Balsam from 13 sites in our river valleys, meadows and woodlands.

This Initiative arose initially from the River Wey Partnership who set up The Wey Local Action Group to help tackle the problem of Himalayan Balsam in the River Wey Catchment.

Himalayan Balsam spreads rapidly along the river creating dense stands of vegetation shading out our native vegetation and reducing the biodiversity of our water courses. Because it is an annual plant, it dies back in the winter, leaving our river banks exposed and susceptible to erosion.

In 2012 the Wey Local Action Group (WLAG) received a grant from DEFRA to help train up local volunteers to identify survey and control Himalayan Balsam along the River Wey. SWT with the Surrey Biodiversity Information Centre (SBIC) also produced

a Himalayan Balsam Strategy for Surrey which identified the problems and prioritised areas for control. After the initial training the WLAG organised a week- long series of practicals along the River Wey in July 2012. This week was so successful that the week was repeated this year. However the number of volunteer groups, and organisations wishing to take part, had grown to 15, far too many to fit into a single week! Many organisations already had several work parties planned in July and August which we were able to advertise for them, so a week quickly became a month.

When a new River Mole Partnership was set up in 2013 we were able to work with a whole new set of groups and organisations and incorporate their work parties into the programme for Invasive Species Month. This enabled us to advertise events widely across the County to volunteers and local press.

The local papers really seemed to like the idea of “Controlling Aliens” and we got very good press coverage for the month.

Despite the almost unbearable heat in July over 100 people turned out to help remove Himalayan Balsam from Surrey’s rivers. This concerted effort is making a real difference, with a noticeable decline in the amount of Himalayan balsam at many of the sites tackled in previous years; we hope this trend will continue.

Volunteer groups often find it demoralising when, after working for weeks to remove Himalayan Balsam, they see the plants flowering in adjacent land and the seeds washed back down to their site. This leaves groups feeling alone against an invading army of invasive species. This initiative has put them in touch with similar groups, and has enabled them to work together to tackle the problem.



Volunteers with HB removed from White Rose Lane Nature Reserve in Woking (Surrey WT)

This partnership working has helped us to prioritise sites, and maximise results; enabling us to achieve far more than any single organisation. I can thoroughly recommend this type of campaign to other organisations. Plans are already in place for Invasive Species Month next year in July 2014! We are aiming to widen our remit to other NNIS. So if your group or organisation is in Surrey and would like to be involved, please contact Frances Halstead on 07891 514574 or email frances.halstead@surreywt.org.uk www.surreywildlifetrust.org

Volunteering opportunities:

We are a small environmental charity based in the north of Scotland. Our mission is to support the sustainable management of native woodlands. We welcome help from volunteers on our invasive plant and aspen projects. More information is available at <http://coillealba.org.uk/> or e-mail john.parrott@coillealba.org.uk.

Help protect the Tyne Valley from Alien invaders! Tyne Rivers Trust is looking for adventurous volunteers to track down and manage invasive non-native species from Japanese knotweed to Signal crayfish. Training available; including pesticide application certification. Contact Ceri Gibson on 01434 636902 or c.gibson@tyneriverstrust.org or visit www.tyneriverstrust.org for more information.

Natural England needs your help to remove an invasive alien plant, Pirri-pirri bur, from Lindisfarne NNR through seed collection and hand-pulling. Join Reserve staff and volunteers to raise awareness of Pirri-pirri bur and help control other invasives on this amazing Reserve. Call 01289 381470 or email laura.scott@naturalengland.org.uk for more information.

Volunteer task days controlling non native species that threaten the iconic Yew Woodlands of Castle Eden Dene, County Durham. We have regular Wednesday volunteer groups controlling rhododendron in the winter and Himalayan balsam in the summer. Currently seeking 2 full/part time volunteer project officers. Contact christopher.evans@naturalengland.org.uk

Tees Rivers Trust are mapping & controlling invasive non-native species throughout the Tees catchment area. We need local groups and volunteers to help save our rivers. Training and support will be given. Please contact johnmusham@teesriverstrust.org

The Friday Green Team at Skelton Grange works hard to control invasive species and develop a rich and bio-diverse site. Come for a one off day or every week – get involved and learn new skills. No previous experience is needed! 0113 2430815, skelton@tcv.org.uk, www.tcv.org.uk/skeltongrange

Help us control the spread of invasive non-native species in Lancashire. Volunteer with us on practical control days throughout the summer, or send us your records of invasive species at any time of year. Add your sightings to the map at www.lancashireinvasives.org. Contact: admin@ribbletrust.com Tel: 01200 444452

BEACON aims to eradicate invasive species from the River Bollin catchment in Cheshire. There are opportunities to help with practical control work, surveying, mapping, education and events. Control work events will be held June-August 2014. If you would like to get involved please contact Sal Davies on 07825 115303 or sally.davies@nationaltrust.org.uk

Balsam bashing on the Carrs in Wilmslow, Cheshire Sun 22nd June and Sun 20th July 2014 2pm - 4pm both days Meet at Twinnies Bridge Car Park OS grid ref: SJ839823 All welcome!!! ian.baillie@friendsofthecarrs.org.uk

Do you live in Norfolk? Do you want to help protect wildlife? Norfolk Non-native Species Initiative co-ordinates volunteer surveys and work parties to deal with invasive species. To find out more visit our website. We also offer volunteer opportunities at our Norwich office. <http://www.norfolkbiodiversity.org/nonnativespecies/>

The CRT is tackling alien species in the Cam catchment in South Cambridgeshire, primarily to help the Water Vole population. We work on Mink, Himalayan Balsam, Giant Hogweed and Signal Crayfish. If you can help by volunteering on this project contact vincelea@btinternet.com see <http://bit.ly/1aqDnuu> for details

We are tackling aliens in the Dedham Vale and Stour Valley – the Dedham Vale AONB and Stour Valley Project are working with a range of partners and volunteers to tackle the problem of non-native invasive plants along the Suffolk/Essex border. Check out our website for more info and contacts: www.dedhamvalestourvalley.org

The Anglesey AONB have regular volunteer days carrying out practical conservation work to improve the special qualities and outstanding landscape of the AONB. Join us as we continue our fight against invasive species such as Rhododendron ponticum and Himalayan Balsam. For more information, contact Lowri Hughes on 01248 752446 or lehpl@anglesey.gov.uk

The Wildlife Trust of South and West Wales runs weekly balsam bashes at Parc Slip Nature Reserve (CF32 0EH) throughout the summer months. We need all the help we can get so please volunteer! Details will be published at www.welshwildlife.org next year. Ring 01656 724100 for more details.

Keep Wales Tidy appeals for volunteers to help rid Carmarthenshire of Himalayan Balsam. The species is taking a hold of some areas and action is needed to control the plant before it spirals out of control, damaging our biodiversity further. daniel.snaith@keepwalestidy.org 07824 504805

The DINNS Project, led by North Wales Wildlife Trust is seeking committed conservation volunteers and community groups to help combat invasive species on the River Dee Catchment in England and Wales. Work includes survey, monitoring and removal of species such as Himalayan Balsam and Japanese Knotweed. Email Lyn on lynbyrne@wildlifetrustswales.org

Do you want to be part of The Big Dee Day – The Invasion 2014? Organisation across the River Dee catchment in England and Wales are holding a jam packed programme of invasive species control and recording events throughout July 2014. For a BDDTI 2014 events programme please email lynbyrne@wildlifetrustswales.org

The Environment Trust for Richmond Upon Thames work to control invasive plant species across the three London boroughs of Richmond, Kingston and Hounslow. The Trust works to remove invasive Himalayan balsam. We also work to remove invasive Rhododendron ponticum and restore hazel coppice. For further details, potential volunteers should contact Chris at chris.cockel@environmenttrust.co.uk <http://etrutvolunteering.blogspot.com/>

Himalayan Balsam pulling on the Monk's Brook. Join The Conservation Volunteers on the Monk's Brook in Eastleigh and Southampton, Hampshire. We'll be holding volunteer pulling days throughout Summer 2014 to systematically control Himalayan Balsam throughout the river catchment as part of our partnership INNS project. Contact eastleigh-projects@tcv.org.uk or 02380 402593

Join us for some Rhododendron clearance on Sunday 8th December, 10am to 4pm. We will be working for the National Trust at Half Moon Common, near West Wellow, Hampshire. Hampshire Conservation Volunteers. Find us on the web or call Alan on 023 92325570 for details.

Our Biodiversity Action Team helps manage many invasive species, including Goat's Rue, Himalayan Balsam, Giant Hogweed and Japanese Knotweed, in the Lee Valley Regional Parks and many other nature reserves in north east London. Sessions are every Tuesday and Wednesday. Enquiries contact Tom Nandi on 07917 267573 or at t.nandi@tcv.org.uk

Halt the invasion! Working in and around South Gloucestershire and Bristol watercourses. We are focused on Non-Native Invasive Plants, their location and their eradication. If you would like to volunteer in the Spring/Summer of 2014 please contact Neil Green on 07866 764280 or via email ngreen@bristolzoo.org.uk. We need you...Get Involved!

Wildlife Hit Squad Project - East Dartmoor NNR Practical volunteer tasks will take place during summer 2014 to remove invasive non-native Himalayan Balsam along the length of the River Bovey in eastern Dartmoor. Groups and individuals welcome. For more information contact Natural England on 01626 832330 linda.corkerton@naturalengland.org.uk

Interested in helping to remove invasive species from our waterways – join the Inland Waterways Association next year as it continues its campaign against Himalayan Balsam. Balsam Bash events will run from June to August 2014, contact Stefanie Preston for more details - stefanie.preston@waterways.org.uk or 01494 783453

The catchment wide approach to Invasive non-native species

In the summer of 1999, the Medway Valley Countryside Partnership (MVCP) began working to control hotspots of the invasive non-native species giant hogweed (*Heracleum mantegazzianum*). This programme eventually grew to become the "Medway Catchment and River Cray Giant Hogweed and Non Native Flora Control Programme", covering almost 200km of riparian land and including additional species.



The decision to begin treatment was a response to the problems caused by the plant and the lack of any existing coordinated effort to control it. Giant hogweed is covered under Section 14(2) of the Wildlife and Countryside Act, 1981, which effectively places the responsibility for control with the landowner.

However, with no single authority responsible for its control there had often only been limited action to reduce the spread of Giant Hogweed. In response to the hazards it posed and the lack of a coordinated approach, the treatment initiative was created to co-ordinate and support action taken by landowners to control giant hogweed.

Initial efforts targeted known hotspots which were causing a serious public health hazard, previously identified in the National River Authority's 1995 River Corridor Survey and which had become more extensive in the years following.



The logistics of control in inaccessible locations can be challenging (MVCP)

MVCP adopted a partnership approach with the support of the Environment Agency, local borough councils, farming and conservation agencies and users' groups. Links were built with landowners along the target sections of the Medway to coordinate treatment.

The methodology has remained similar over the years. The catchment wide approach, whereby landowners are actively involved and contribute to the scheme via MVCP, works well in ensuring that as much land as possible is treated, where required.

Glyphosate is applied by specialist contractors. This was chosen because it is an effective systemic herbicide, cost effective in large quantities and is approved for use near watercourses under the control of Pesticides Regulations (1986). Treatment

is organised systematically each year with access either by land or by boat.

Earlier in the programme MVCP staff carried out surveying but this proved to be logistically difficult and time consuming. In more recent years the contractor uses GPS to log locations and numbers of plants treated. The information is then stored and analysed using GIS.

The spray programme takes place during spring and early summer; after the new plants have germinated but before flowering. As the plant is usually a biennial any new growth that is missed or that appears after the treatment can be treated in the following year without risk of seed production. Later spot treatments can be organised if necessary to tackle any newly identified areas or subsequent growth which is a hazard to the public.

The landowners are contacted each year to raise awareness of giant hogweed and of their responsibilities. Each is offered the opportunity to join or continue the spray treatment programme, which we can offer cheaply due to subsidisation funding from partners and economies of scale. Participating landowners sign a consent form, which includes a payment agreement.

Communication is crucial to maintaining awareness and engagement. To this end MVCP produces up to 3 newsletters each year to update participants and interested parties as well as taking opportunities to promote the scheme in the press and at talks about MVCP's work.

The majority of landowners have welcomed the scheme and taken up the offer of treatment, with a minority electing to carry out their own control. Due to a viable seed bank and some issues with landowner consent and therefore untreated stands, complete eradication has not been a feasible target over the last decade, but substantial reductions have taken place. MVCP continue to work towards filling any gaps in landowner knowledge so more plants can be treated, therefore the overall long term aim is the eradication of the plant in this catchment area.

The greatest threat to the success of the programme is non co-operative landowners who do not issue consent and non co-operative landowners who claim to carry out their own control but do not. Other significant issues include finding a low cost method of sourcing landowner data and access issues, which make treatment difficult.

The project is now a much bigger task since the time of its inception and involves almost 300 landowners. Despite its growth in size and the greater management required the project's catchment scale methodology, involving landowner consent and greater blanket control, proves successful.

More recently the programme has been expanded to include additional invasive non native species with some areas of riparian Japanese knotweed (*Fallopia japonica*) Himalayan balsam (*Impatiens glandulifera*) and floating pennywort (*Hydrocotyle ranunculoides*) addressed. Each species presents its own control challenges and although economies of scale are helpful, the lifecycles often mean that treatments for different species cannot be performed at the same time.

With the catchment wide approach having proved largely successful, the focus is now on the next five years and how to transition to a model which is sustainable without much of the funding the scheme currently receives. The issue of non-compliant landowners will have to be tackled by working with organisations such as the EA, Police, neighbours and users. More partnerships will be needed with local communities to help with swift identification and treatment of fast spreading species such as floating pennywort.

With the widespread use of smartphones, new tools are becoming available to help identify and report invasive non native species. The PlantTracker app (<http://planttracker.naturelocator.org/>) enables the user to submit geo-located photos and the information can then be shared with those operating control programmes.

Whatever tools are used, the lesson from our experience are that a partnership approach, drawing together support from all relevant agencies and all those affected, is essential.

You can contact Medway Valley Countryside Partnership 01622 683695, medway.valley@kent.gov.uk

Identification & sightings:

RAUK is a free forum and identification guide to the reptile and amphibian species found within the UK whether native or alien. You can also obtain advice from highly experienced herpetologists regarding these species. Visit our website at <http://herpetofauna.org.uk>

Ecosystems Knowledge Network
The Ecosystems Knowledge Network is a resource for anyone wanting to share knowledge or learn about the practical benefits of an ecosystems approach. It draws together experience from the UK and elsewhere to assist organisations to understand how an ecosystems approach can help us build sustainable communities. Find out more at www.ekn.defra.gov.uk



Floating pennywort grows rapidly and even a small untreated area can cause new outbreaks each year (MVCP)

Record sightings of non-native plants invading the edges of watercourses in the North Pennines AONB. These species threaten native species and our rich habitats. To report your observations, please visit our website www.northpennines.org.uk/WildWatch. Your data will help us build up a picture of the problem in the AONB.

The 'That's Invasive' app is now available for iPhone and Android allowing you to ID and record invasive species across Europe. Developed by the RINSE project. RINSE aims to improve management of invasive species across Europe by identifying future priorities and sharing best practice. E-mail: nnsi@norfolk.gov.uk or see www.rinse-europe.eu

Isoperla are the leading developer of wildlife apps in the British Isles. We work with expert organisations and ecologists to bring the best quality content to mobile platforms. Innovation is key to our success with Automatic Recognition of bird song already available and visual Automatic Recognition coming soon. Contact info@isoperla.co.uk

naturelocator

The invasive non-native species apps are here

Record invasive non-native species on the move with the PlantTracker, Aquainvaders and Sealife Tracker apps.

Available for iPhone and Android (OS 4.0.3+)

Your records will be verified by an expert and will contribute to the national data set on invasive non-native species.

Download these apps for free and try them out – we would love to receive your sightings.

<http://naturelocator.org/snh.html>

Environment Agency, BSAC, Scottish Natural Heritage, SEPA, THE MARINE BIOLOGICAL ASSOCIATION, BRC

Crowd Control? Invasive Non Native Species in the UK...



'Invasive Alien Species (IAS)', 'Invasive Non Native Species (INNS)', 'Invasive Exotics' (IE) or simply 'Invasive Species', are species that cause either environmental, health and/or economic damage. While 'Invasive Species' can refer to native as well as non-native species, IAS, INNS or IE all specifically highlight flora or fauna that are not native to the country or region that they are invasive within. This article will focus on invasive non-native plants.

In Britain, there are around 1,500 native vascular plants. The figure for non-native species established in the wild is thought to be around 1,350 terrestrial and 23 freshwater plant species¹ (if you include species grown in gardens then there are around 70,000 non-native plants in Britain). However, only 108 of these are identified as having a negative impact and are therefore true invasive non-native plant species². Invasive non-native plants damage the environment in a number of ways. They out-compete native flora for light, space and nutrients. They can reduce the light and heat reaching lower-growing plants, alter rates of nutrient cycling, or (in freshwater habitats) cause large changes in the amount of oxygen available, all of which can be harmful to other plants and animals. The environmental damage caused by invasive non-native plants can be irreversible and destroy many of our national natural treasures, including our Important Plant Areas³. In fact, 30% of Important Plant Areas have been found to have invasive species in them and the Convention on Biological Diversity considers invasive non native species to be one of the main direct drivers of biodiversity loss across the globe.

Invasive non-native plants tend to share similar characteristics. These can be grouped into three key factors that commonly combine to enable a plant to become invasive:

- 1) In their natural ranges, invasive plants are often common but not problematic. Their extent is limited by natural pressures from herbivores, disease and other plants that compete with them for resources. However, when these plants are placed in a new environment, these containing pressures are often missing, giving the new plants an advantage over native plants which are still affected by their local pathogens and herbivores.
- 2) Invasive plants are often characterised by fast growth, prolific seed production and/or an ability to spread vegetatively, an ability to tolerate wide ranges of growing conditions (soil types or water pH, for example), and a range of ways in which seeds can be spread locally and over larger distances (say, by wind, water or animals). People are often instrumental in spreading invasive plants.

- 3) The environment that the new plant is placed in is in some way disturbed or damaged, providing the opportunity to invade. For example, in polluted water systems, more nutrients are available than can be used by the native plants present, giving the invading plants an opportunity to get established.



Cotoneaster *integrifolius* & *horizontalis* colonising limestone cliff (Tim Wilkins, Plantlife)

Whilst only a small number of non-native plants do become invasive, the damage that they can cause to wildlife, the countryside and even humans is significant. In Britain, approximately £1.7 billion is spent annually on trying to tackle the problem of invasive non-native species. However, this is probably an underestimate as the 'indirect costs' associated with invasive species, such as damage to ecosystem service provision, are not accounted for in this figure. The damage to our wildlife and waterways has been well documented - millions of pounds are spent clearing them from congested ponds and rivers, with delicate rare water flowers such as starfruit *Damasonium alisma* pushed to extinction under carpets of New Zealand pygmyweed. This invasive curly waterweed is now found in 400 hectads (10 km squares) across Britain. Yet, the rate of spread continues to increase, as does the number of these plants entering Britain (although from April 2014 it will be illegal to sell New Zealand pygmyweed in England or Wales).

In 2003, Defra published a report that reviewed non-native species policy. It was in this report that banning the sale of invasive non-native species was recommended. In 2006, the necessary amendments were made to the Natural Environment and Rural Communities Act that meant the legislation was in place to give Government the powers to ban

the sale of invasive plants listed on Schedule 9 (which was last updated in 2010⁴) of the Wildlife and Countryside Act (WCA). It is also an offence to plant or otherwise cause to grow in the wild invasive non-native plants listed on Schedule 9 of the WCA. Ten years later, in January 2013, Defra announced the development of a new regulation that will ban the sale of five invasive non-native aquatic plants under Section 14Z(a) of the Wildlife and Countryside Act. However, the regulation will not come into force until April 2014. The five species which after April 2014 can no longer legally be sold in England and Wales are:

- Floating pennywort *Hydrocotyle ranunculoides*
- Floating water primroses *Ludwigia* spp.
- New Zealand pigmyweed aka Australian stonecrop *Crassula helmsii*
- Parrot's-feather *Myriophyllum aquaticum*
- Water fern *Azolla filiculoides*

Plantlife was astonished that traders and retailers were given 14 months to 'adjust' to this regulation, an activity that could legitimately include selling species off cheaply and in bulk to reduce stocks, especially since the proposal for this ban had been well known for 10 years. Still, now that a first ban is implemented, there are a number of additional species that we believe should also be considered for a ban from sale. These are listed on the Plantlife website⁵.



The removal of Cotoneaster from Portland (Plantlife)

The Invasive Non-Native Species Framework Strategy for Great Britain, which was also a recommendation from the 2003 policy review report, was launched in 2008 and is currently being reviewed. The GB INNS Strategy intends to provide a strategic framework for government departments, agencies and key stakeholders to work more effectively together. The key aims are to help prevent new invasive non-native species from entering and becoming established in Britain, to improve co-ordination to tackle invasive non-native species already here, and to raise awareness. This strategy has been a helpful and important tool towards tackling INNS but there is still much to be done, particularly as the number of INNS entering Britain continues to rise. The current review of the Strategy will help to prioritise the next set of actions such as entry pathways of invasives into Britain. This should be complimented by the recently published draft EU Invasive Alien Species Regulation that is currently being discussed by EU Member States.



Shows the team of volunteers who helped with removing Cotoneaster from Portland (Plantlife)

In September 2013, the European Commission proposed new legislation to prevent and manage the rapidly growing threat from invasive species. There are currently over 12,000 non-native species present within the European wild environment. Approximately 15% of these are invasive and they are costing around £10 billion. If the draft EU Regulation comes into force it will oblige countries to carry out surveillance and risk assessments; identify how species get in and out of their territory and tackle those pathways; identify species of concern; set up early warning systems; and establish plans for rapid action⁶. The Regulation should ensure countries work together to prevent the spread of invasive species. However, of the 1,800 INNS across Europe, it is currently proposed that only 50 of these will be covered by the EU IAS Regulation. The justification for only including 50 species has not been published however it is likely to be driven by economic rather than ecological arguments. Considering the problem and costs of tackling invasive species continues to rise across Europe it would be more appropriate for the INNS species covered by Regulation to represent the true scale of the problem.

Plantlife, as an environmental NGO working to protect wild plants both 'on the ground' and through raising awareness, is running a number of projects focusing on removing invasive plants specifically within Important Plant Areas (IPAs). A key invasive we have experience in removing is Entire-leaved cotoneaster (aka Rock-spray) (*Cotoneaster integrifolius*). Initially, Plantlife was involved in a three-year project on Torbay limestones IPA where Cotoneaster control was the focus. This project ended around a year ago having had a 99% effective control rate. The experience and knowledge gained was passed on to an ongoing project in Portland and Dorset Coast IPA. This IPA is internationally important for its lichens and bryophytes, which are under threat from several varieties of Cotoneaster. The Cotoneaster is dominating the priority habitats, namely lowland calcareous grassland (unimproved limestone grassland) and maritime cliff and slopes, that support the rare lichens and bryophytes (there are 6 Section 41 species present). Plantlife has tried and tested techniques for removing Cotoneaster whilst ensuring for minimal impacts on the rare species and their priority habitats. From our experience gained at Portland we have teamed up with the National Trust in Gower IPA and, subject to funding, Cotoneaster will be removed from approximately 30ha. Other work, also in partnership with the National Trust, has been the removal of hottentot-fig (*Carpobrotus edulis*) from the Lizard IPA. This is internationally renowned for the botanical richness of its open heath and coastal cliffs, and is often heralded as one of the top five plant places in Britain. Lizard Point, the extreme southern peninsula of the IPA, is home to several significant populations of endemic wild asparagus (*Asparagus prostratus*), long-headed clover (*Trifolium incarnatum* subsp. *Molinerii*) and prostrate broom (*Cytisus scoparius* subsp. *Maritimus*). These native species are under threat at Lizard Point through the dominance of INNS, in particular hottentot-fig (*Carpobrotus edulis*). If you'd like more information about these projects please contact Plantlife⁷.



Where the ground was not too steep large mats of the Hottentot Fig were rolled up and removed from site (National Trust)

Invasive non-native species are a growing problem and, whilst there has been some progress, for example through awareness-raising campaigns, more development is needed. As shown in the examples above, Plantlife has been focusing on tackling INNS at sites that are particularly important for wildlife such as IPAs. However, there is no co-ordinated national action plan to tackling those INNS already here and, in combination with limited resources, significant progress is hindered. In addition, new INNS continue to arrive and the cost to the UK will continue to rise unless the pathways of invasive species are addressed with Pathway Action Plans, as set out in the GB Strategy. Full implementation of GB Invasive Non-Native Species Framework Strategy and UK support for the EU draft Invasive Alien Species Regulation will help tackle the threat INNS pose to our environment.

References:

1. www.britishecologicalsociety.org
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3. Important Plant Areas
4. Plants listed on Schedule 9 of the Wildlife and Countryside Act in England and Wales
Plants listed on Schedule 9 of the Wildlife and Countryside Act in Scotland
5. http://www.plantlife.org.uk/campaigns/INNS/invasive_non-native_plants_and_the_law/
6. http://www.wcl.org.uk/docs/Link_IAS_regulation_publication_press_release_Sept13.pdf
7. enquiries@plantlife.org.uk or camilla.keane@plantlife.org.uk

Japanese Knotweed (*Fallopia japonica*)

By Graham Rudd, Business Manager, Invasive Weeds Agency Ltd



Since 1981, it has been illegal in the UK to plant or otherwise cause to grow Japanese knotweed in the wild yet it has only been in recent years that the public has become aware of this non-native invasive weed. Banks and building societies have taken notice of the problems that Japanese knotweed can cause and as a result many of them restrict or refuse to lend money for properties affected by this menace. As a consequence, many property sales have fallen through and people have become increasingly frustrated by Japanese knotweed. A myth has been perpetuated that it is nearly impossible to kill and that it will spread so quickly that it will smother everything in its path. As a result, there has been a recent surge in companies claiming to be experts and purporting to know a magic formula for eradicating this weed. The prices being quoted could be anywhere from less than £100 to more than £1 million. With astronomical prices being estimated nationwide by unqualified tradesmen, it is time learn more about Japanese knotweed and the ways to tackle it in order to protect your own or your client's investment.

Further information on the ecology and identification of Japanese knotweed can be obtained from *The Knotweed Code of Practice*, The Environment Agency.

What damage can Japanese knotweed cause?

Japanese knotweed is able to colonise a variety of urban and rural environments as it will grow in most soil types and it is fiercely competitive with surrounding species. Due to its ability to exploit weaknesses in construction material, such as concrete and tarmac, new knotweed growth can cause damage to structures and roads thus affecting the value of property as it rapidly develops. Japanese knotweed grows particularly well along riverbanks and it is able to colonise large areas because the waterways act as a distribution route for stems and rhizomes as they get carried downstream. Damage to flood defences may occur and there have been instances of Japanese knotweed restricting waterways resulting in flooding. Ecosystems can be disrupted by the presence of Japanese knotweed as it can starve the surrounding native plants of resources, seriously impacting on the delicate balance of local food chains.



Japanese knotweed emerges in back garden
(Invasive Weeds Agency Ltd)

The financial damage caused by Japanese knotweed has increased dramatically over the past few years with many mortgage applications being refused due to the perceived threat that Japanese knotweed may have to properties in close proximity to an infestation. It is commonplace for house sales to fall through as a result of surveyors identifying Japanese knotweed, sometimes inaccurately, at a property; however, this situation can be resolved by appointment of a specialist company to eradicate the infestation. In 2003, DEFRA estimated that it would cost the UK more than £1.5 billion to eradicate Japanese knotweed on a national scale.

How can you eliminate Japanese knotweed?

Japanese knotweed infestations can be controlled and eliminated through a variety of methods, depending on factors such as timescale, location of the infestation and its surrounding environment. Due to the potentially high costs involved with some methods, often the main factor governing the control strategy is money. The main methods of control are:

Herbicide

Qualified and competent personnel are permitted to use pesticides (herbicides) to control and eliminate Japanese knotweed. The application method and specific chemical used will depend on factors such as the infestations proximity to watercourses and local wildlife. Application techniques include; spraying, stem injecting and wiping. The minimum qualifications required for operatives are NPTC PA1 and PA6 (PA6AW is required for pesticide application beside water). The highest accreditations for companies using pesticides for weed control are BASIS Amenity Assured and BASIS Advanced Contractor Certification Scheme (BACCS) membership.



House built on top of a Japanese knotweed infestation (Invasive Weeds Agency Ltd)

Off Site Disposal

This method involves mechanically excavating the Japanese knotweed and taking it to a licensed landfill site. Following Environment Agency/SEPA guidance, the excavation may be to a depth of 3 metres and extend 7 metres from any Japanese knotweed present above the ground. These figures are for the worst case scenario and it may not be necessary to dig as far and as deep.

This option attracts costs from excavation of the contaminated material, transport to landfill and the cost of placing it in landfill.

Screening

Japanese knotweed is mechanically excavated and put through a specially designed machine that will separate the weed from the soil. The Japanese knotweed is removed and disposed of at a licensed landfill site. The soil can be re-used on site. This method drastically reduces the amount of material to be disposed of therefore keeping the cost approximately 50% lower than the traditional Off Site Disposal method.

Burial

If time is a factor and it is unfeasible to wait for the numerous growing seasons that herbicide treatment may take to eradicate an infestation, Japanese knotweed can be excavated and buried on site. All material contaminated with Japanese knotweed is encased in a root barrier membrane that prevents further growth and buried at a depth greater than 5m below the surface to prevent the material being disturbed and re-infesting the area. (The acceptability of this method varies between different countries of the UK.)



Japanese knotweed in bloom (Invasive Weeds Agency Ltd)

Bund (Relocation & Herbicide)

If burial on site is not an option, a bund can be created by designating an area of the site to place all material and soil contaminated with Japanese knotweed. The bund is then treated with herbicide allowing the original area of infestation to be developed or managed without the presence of Japanese knotweed being an issue. This method can be applied if there is sufficient time and space to relocate contaminated material and treat it on site, preventing the high costs of disposing Japanese knotweed at a licensed waste management facility off site.

Cutting

Japanese knotweed stems can be cut and dried out however this will only address the growth above ground

and will take many years to effectively control the infestation without the use of chemicals or digging out the Japanese knotweed rhizome.

Burning

As with cutting this method can be ineffective without excavating Japanese knotweed rhizome from the soil and burning it with all plant material. If done correctly, this method can eliminate the Japanese knotweed quickly and for a lower cost than Off Site Disposal.

Biological Control

After careful research and development, tiny plant-eating psyllids have been identified as a possible means to control Japanese knotweed, with tests being done to establish whether to release them nationwide. The 'knotweed bugs' have been released in some parts of England as part of a trial. Although they may control

the Japanese knotweed they will not eradicate it fully otherwise the bugs would have nothing left to eat and they would die out.

How much will it cost to eradicate?

The calculations below are based on an area of Japanese knotweed 5m x 5m, excavated to a depth of 2m with an additional 4m buffer zone around the perimeter. An insurance backed guarantee for work may be an additional charge depending on the duration of guarantee required.

| Treatment | Timescale | Cost (£) |
|-------------------------------|------------|----------------------------|
| Herbicide treatment | 1- 3 years | 2,000 – 4,000 |
| Off Site Disposal | 1 Day | 8,000 – 10,000 |
| Screening | 2 Days | 4,000 – 5,000 |
| Burial | 2-3 Days | 5,000 – 6,000 |
| Bund (relocation & herbicide) | 2 Days | 4,000 – 5,000 |
| Cutting | 5+ years | Not commercially available |
| Burning | 1-2 Days | 6,000 – 8,000 |
| Biological | Unknown | Not commercially available |

How do I prevent Japanese knotweed spreading?

Japanese knotweed spreads through fragments of rhizome and cut stems, capable of producing new shoots and roots when buried in soil. It only takes a piece of rhizome 0.7g to generate into a new plant, however, not all rhizomes this small will regenerate. This vegetative material can be carried far and wide, completely unnoticed on the sole of a shoe or the tracks of construction vehicles. If Japanese knotweed growth has been discovered it is important not to attempt to move or break the stems or uproot the plant. Take measures to prevent access to the infestation.

Japanese knotweed is spreading into my land from my neighbour’s land. What is the law on this?

Although it is not illegal to have Japanese knotweed growing on your property, your neighbour should be made aware that allowing Japanese knotweed to grow from their property onto other people’s property may be regarded as a private nuisance and this would be a civil matter under common law. If you think that you are at risk from Japanese knotweed on neighbouring property contact Invasive Weeds Agency for impartial advice.



Japanese knotweed rhizomes (Invasive Weeds Agency Ltd)

Can I eliminate Japanese knotweed myself?

It is highly recommended that any attempt to control Japanese knotweed should only be carried out by trained and qualified persons. Due to the highly invasive nature of the plant, its complete eradication may require the use of potentially harmful chemicals that could put the user and the surrounding environment at risk if incorrectly applied. If the control relates to the sale of a property it is usually necessary to appoint a professional contractor who offers an insurance-backed guarantee to ensure funding by a mortgage lender.

Where can I find a qualified and competent company?

The Invasive Non-Native Specialists Association (www.innsa.org) is the trade organisation for Japanese knotweed consultants and contractors. Their members’ list shows the UK’s most knowledgeable and best-qualified companies.

Where can I find out more about Japanese knotweed?

The Internet has a wide range of information on Japanese knotweed but beware of scare-mongering! The Environment Agency ‘Knotweed Code of Practice’ is the key resource.

Reference:

- japaneseknotweed.com (Identification, treatment options, videos, news, legislation)
- nonnativespecies.org (Identification, risk assessment, etc.)
- environment-agency.gov.uk/homeandleisure/wildlife/130079.aspx (Knotweed Code of Practice)
- innsa.org (Case studies, news, contractors list)
- legislation.gov.uk/ukpga/1981/69 (WCA 1981)
- basis-reg.com (Pesticide contractors list, Amenity Assured scheme info)



INNSA The Invasive Non-Native Specialists Association (INNSA) is the industry body for companies involved in controlling and eradicating invasive non-native species in the UK. INNSA aims to improve standards within the industry and offer peace of mind to clients. For more information on our members and how to sign up go to www.innsa.org

Companies:

Do you need expert advice on Red & Grey Squirrels? Do you need Mink traps or Squirrel traps? Do you need Japanese Knotweed eradicated within one growing season? We also do Crayfish conservation and management, invasive Fish surveys and management, Mink and Squirrel trapping. Call us on 0333 9000927 or email customersupport@wildlifeservices.co.uk



Ecological Land Management Ltd have over ten years of experience in the control of Alien Invasive Species in ecologically sensitive places: SSSIs, SACs, river catchments and moorland. ELM work regularly with charities, NGOs, Natural Resources Wales and Natural England. Contact us at www.elm.uk.net

Ecological Land Management
Conservation & Wildlife Protection
www.elm.uk.net



Rheoli Tir Ecolegol
Coduroeth a Gwarchod Bywyd Gwyllt
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Japanese Knotweed Solutions Ltd JKSL have specialised in the treatment of Japanese knotweed for over ten years. We provide the complete service from identification, eradication and ongoing monitoring. Services include site surveys, method statements, costed options of eradication and site works with insurance backing. JKSL are a Steering Group member of trade body, INNSA. www.jksl.co.uk



Phlorum is a specialist environmental consultancy with an expert team offering advice, monitoring and treatment services in respect to Japanese knotweed. Phlorum offer a range of options from chemical treatments through to excavation and removal and we can create tailor made packages to fit your project. We offer insurance backed warranties for all our knotweed projects-please call us for information on 01273 307167 or email info@phlorum.com.

For help identifying knotweed please go to www.phlorum.com for photographs and descriptions of what to look for. We also have teams specialised in ecology, air quality, noise, vibration and flood risk assessment.

www.pba-ecology.co.uk is one of the UK's leading freshwater and terrestrial ecology practices. We provide a combination of desk and field based terrestrial and aquatic surveys, to establish the presence and status of non-native invasives. We determine the level of risk posed, and provide practical mitigation advice and cost-effective solutions.



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BART is a community-led charity which aims to deliver education, land and river management advice and practical river restoration work in the Bristol Avon Catchment. We currently have projects on the By, Wellow and Cam brooks above Bath do contact us if you have an interest in these areas. www.bristolavonriverstrust.org



Specialists in environmentally sensitive control of invasive species. With offices across the UK, Ecus ecology team specialise in invasive species survey, risk assessment, integrated control programmes, management plans and biosecurity protocol for the public and private sectors. Contact us for further information on our services: W: www.ecusltd.co.uk E: contactus@ecusltd.co.uk T:0114 2669292



Caledonian Conservation Ltd provides a range of ecology services for development and conservation projects in the UK, including non-native invasive species surveys and management advice (eg giant hogweed, Japanese knotweed, Himalayan balsam, alpine newts, killer shrimp etc.). For further information contact us (info@caledonianconservation.co.uk / 07789 771166) and visit our website www.caledonianconservation.co.uk



Invasive Species Compendium

Freely available and open access – detailed coverage of invasive species threatening livelihoods and the environment worldwide

Detailed coverage of invasive species threatening livelihoods and the environment worldwide

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Invasive species are a major threat to the global economy and the environment, costing billions of dollars to control each year.

The Invasive Species Compendium is an online, comprehensive encyclopaedic reference work covering recognition, biology, distribution, impact and management of the world's invasive plants and animals. Developed by CABI, with support from a consortium of partners, this resource is the most extensive and authoritative compilation on the subject in the world. www.cabi.org/isc



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Eco Weed Tech - "Specialist in Non-Toxic Weed Control using Hot Foam". We use an organic-approved hot foam treatment to control weeds. Not deemed a herbicide by CRD so can be used in environment sensitive areas such as SSSIs & Clean Water sites. Especially good against *Crassula Helmsii*. Call 07876 122481 or see www.ecoweedtech.co.uk for more information.

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Devon Wildlife Consultants can undertake detailed walkover surveys to record and map invasive plant species listed on Schedule 9 of the Wildlife and Countryside Act (1981), such as Japanese knotweed, Himalayan balsam, giant hogweed etc. Please give one of our experienced consultants a call on 01392 455930 or email: dwc@devonwildlifetrust.org. www.devonwildlifeconsultants.co.uk

Invasive non-native species in urban areas

Over thousands of years of trade and travel we humans have intentionally and unintentionally transported species around the world. As trade centres like Londinium grew, now modern day London, it facilitated movement of species into the United Kingdom from the Roman Empire throughout Europe. This has led to a wide range of non-natives becoming entrenched in our environment with any traces of their negative effects lost to time. Indeed many of these species are now imbedded into what is considered a naturalized landscape throughout our nation.

london invasive species initiative

As this trade is crucial for our economy it, along with the transport of species, continues; the distances travelled have grown and the time taken to make these trips has shortened considerably. This has led to new waves of species being successfully transported around the globe. This increased movement and London's function as a major international centre are key drivers facilitating new species introductions. For example early in November a Londoner was surprised by some suspected Brazilian Wandering Spiders (*Phoneutria nigriventer*) which had been imported with some bananas, so thankfully not all imported species become invasive.

When you consider standard invasion theory we note that success depends on several factors. Initially having a higher number of species being imported into an area can increase the chance of importing a potentially invasive species. London easily caters for this through its many international arrival points and its high level of import from around the globe. Importing new species is not solely the result of travel and trade but can also happen for example through the illegal release of unwanted pets and plants.

In addition to London's functions as a major international hub there are other factors that contribute to its success in relation to invasive non-native species. As distances travelled become swifter and transport methods such as refrigeration are being improved more species are arriving into the country in a fitter state.



Himalayan Balsam (*Impatiens glandulifera*) making the most of all habitat by growing on a floating island of rubbish, 2013 © LISI

Where a journey of several days or weeks has become merely hours we are allowing a wider range of species to travel along with us and survive the journey.

As these potentially invasive non-native species are released into urban areas we must then consider the ability of the species to survive and multiply. Urban areas have a range of different habitat types and niches available and a bigger range of critical resources i.e. food, water and shelter. Therefore a released species has a higher chance of finding the habitat it requires i.e. either terrestrial (parks, nature reserves, backyards) or aquatic systems (i.e. streams, lakes, wetlands, bogs, ponds) required.

So because of all these factors we can see that urban areas are set up well to support new potential invasive non-native species populations. Although it is important to note that not all species accidentally imported are destined to become invasive. Therefore we must consider the conditions once the species has become settled and established as there are other environmental conditions which are unique to urban areas.

One major difference is climate, specifically in relation to the urban heat island affect. This is where heat created from items such as air conditioners, traffic, and industry etc is stored in building material and redistributed into the environment. This only occurs in highly urbanised areas and can raise both the minimum and maximum temperatures. This is important as climate defines many aspects of species behaviour and therefore is directly related to their ability to persist in a new location. This is particularly important as low temperatures tend to be a limiting factor for invasive non-native species within the UK.



A range of London habitats; low quality habitat along a section of the Brent River, 2013 © LISI

Finally we must consider the people that live, work and travel in and through the city. They are in a unique position as they define how invasive non-native species are perceived and how action is therefore to be communicated, carried out and portrayed within the urban environment. London is a cultural centre and has a highly cosmopolitan population and with this comes a range of ideas, thoughts and relationships of and about nature. These circumstances mean that people's connection to the environment is likely to be different to those of us that manage and work within the environmental sector, which must be kept in mind when considering management.



A range of London habitats; quality wetland at the London Wetland Centre, 2013 © LISI

After considering all this we know that urban areas are in a unique position in comparison to other less-urban areas. Pressure is felt from the increase of species brought into the area in combination with the increased success of finding suitable habitat once arrived. This means that we must be careful to ensure that organisations within the urban framework are up-to-date with invasive non-native species best practice in terms of both risk planning, monitoring, rapid response and management.

This is why the London Invasive Species Initiative (LISI) aims to bring together organisations to deliver practical action to prevent, control and eradicate invasive non-native species while encouraging co-ordination and partnership working to prevent, reduce and eliminate the impacts of invasive non-native species across Greater London. To assist with this LISI and its partners have

create a 'species of concern' list for London which helps prioritise species specifically for London, this list and more information can be found at www.londonisi.org.uk or you can follow us on twitter @LISI_invasives.

Karen Harper, London Invasive Species Initiative, Manager

Training:

Invasive Species is a self study introductory level course about commonly occurring invasive species found in the UK providing useful information on early recognition and control of invasive species. The course comprises 9 weekly modules, finishing with a quiz to gain a certificate. training@acornecology.co.uk 01392 366512 www.ecologytraining.co.uk



Non-native plant identification courses with Field Studies Council in 2014 - 6-8 June in Shropshire and 26 July in London. Expert tutors and ideal habitats to explore and learn about these species. Find out more at www.field-studies-council.org/plants or phone 0845 3454071

Controlling the grey squirrel: Nutkin Ventured, Nutkin gained

First introduced in 1876 to Cheshire parkland, the north American eastern grey squirrel (*Sciurus carolinensis*) has spread across the woodland landscape in Britain aided initially by a flurry of deliberate translocations and parallel releases. Today it has an unbroken range extending from the toe of Cornwall to the Borders of Scotland, with later releases in Aberdeen and into the Scottish Central belt establishing isolated northern sub-populations.

Grey squirrels damage timber crops, they can strip bark from almost all broadleaved tree species. Wild cherry and ash are notable exceptions; the latter of course now threatened by *Chalara fraxinea*. Damage to oak, beech, birch and hornbeam can be particularly extensive, leading to crown death and distortion of stems. This naturally changes the structure of woodland and impacts on other species.

Grey squirrels also predate woodland song bird eggs and chicks. Recent research by Game and Wildlife Conservation Trust quantified the impact of the grey squirrel upon woodland bird song birds using a paired replicate woodland experiment that saw greys culled in some sites but populations left alone in the remaining woodlots. Statistical evidence demonstrated not only that grey squirrels reduced fledging rates, but that their impact was partitioned most onto those bird species that have open cup nests e.g. blackbird.

As significant as these environmental impacts are, it is the apocalyptic effect upon native red squirrels (*Sciurus vulgaris*) that is perhaps most synonymous with the arrival of the grey squirrel to these shores. Cyclical disease epidemics, habitat loss and fragmentation have all historically affected the native red but these are eclipsed by the permanent replacement that has systematically taken place as the grey squirrel has extended its range. Grey has replaced red. And without



Red squirrel in Gwynedd (David Bailey)

our direct intervention it will continue to do so.



Red and grey squirrels in Gwynedd (David Bailey)

There are two major ways in which the grey squirrel causes regional red squirrel extinction; direct resource competition and the transmission of squirrel pox virus. In the first instance, the presence of adult grey squirrels reduces the local survival of young red squirrels. This leads to a progressive decline in populations, as breeding adult reds age, there are fewer young surviving into adulthood and eventually populations fade and disappear. This particular pattern explains why historically some local naturalists had noted a 'co-existence' of reds with greys for many years. The reality was, that was being observed, was a slow and steady path to an ultimate regional extinction.

Squirrel pox virus is a second element in the red squirrel demise. Grey squirrels carry this infection but experience no symptoms; technically this is called an 'asymptomatic infection'. Red squirrels do not show asymptomatic infection, the virus is absent from within their populations; and only found if grey squirrels are present. Detailed research by Moredun Institute has shown that once infected, a red squirrel will typically die within three to four weeks. The virus produces severe ulceration and skin lesions, with an inevitable bacterial assault in the form of secondary infection adding to overwhelm the animal. Grey squirrels are therefore a reservoir of squirrel pox infection; a contagion that if spread to red squirrels produces epidemic mortality and a more rapid replacement of the species by grey squirrels.

It is often argued that if a squirrel pox vaccine were available for red squirrels, then there would be no need for grey squirrels to be culled. This argument ignores the fact that grey squirrels out-compete red squirrels and also damage the wider woodland ecosystem. Culling of grey squirrels is now the foundation of red squirrel conservation programs in the UK, even in those spruce dominated upland habitats that grey squirrels find most difficulty in utilising.

An obvious question is therefore, does culling work? Research in North Wales has shown that during the eradication of grey squirrels from Anglesey the squirrel pox virus was burned out *before* the grey squirrel population was eradicated. The result was a fifteen fold increase in red squirrel numbers with the result that populations have now spread into the neighbouring county of Gwynedd. Elsewhere in the UK co-ordinated culls are also leading to red squirrel re-colonisations with associated economic dividends. Woodland owners are once again able to produce high quality hardwood timber crops, and the tourism industry can benefit because red squirrels are a popular local attraction.

This leads on to the second question, that of sustainability. People often joke '*kill one grey squirrel and three will turn up to the funeral*', and there is a truth that re-colonisation of woodlands by grey squirrels following control is quite rapid; rapid that is if control operations are fragmentary and localised. Co-ordinated control at the landscape scale is however very much a different matter, especially with the rise of well organised and motivated volunteer groups. Active and dynamic volunteers are nothing new in conservation, but their evolving and significant role in grey squirrel culling is. This proactive ingredient in red squirrel conservation helps insulate projects from the fickle fortune of fundraising and introduces a measure of long-term sustainability of effort. A buzz word too is "ecosystem services", and increasingly the integration of conservation with social expectations and demands will focus upon redressing the negative impact of non-native invasive species such as the grey squirrel.



Dr Craig Shuttleworth
Honorary Research Fellow at Bangor University
Conservation Research Team
<http://bit.ly/1caeu1g>

The Asian hornet

Gay Marris – National Bee Unit

Introduction: The health of honey bees and other of insect pollinators are foci of much public concern. Honey bees are affected by a range of pests and diseases that are endemic in Great Britain (GB), but they also face threats from invasive species that are currently absent from our shores. A key role of the National Bee Unit (NBU) is to monitor for the arrival of 'exotic' pests of honey bees to ensure rapid detection and prevent their establishment. One such threat, which has been the subject of a lot of recent media interest, is the Asian hornet (*Vespa velutina*) (Figure 1).

Biology & Lifecycle: Asian hornets are aggressive predators of honey bees and other beneficial insects. Although superficially similar to our native European hornet, *V. crabro*, despite its fearsome reputation *V. velutina* is slightly smaller (<3cm long). It has a dark 'velvety' thorax, from which the subspecies '*nigrithorax*' is derived. While *V. crabro* has a comparatively yellow abdomen, in *V. velutina* only the fourth segment is yellow (Figure 2) and it has yellow legs. Mated queens emerge in early spring and rapidly establish very large

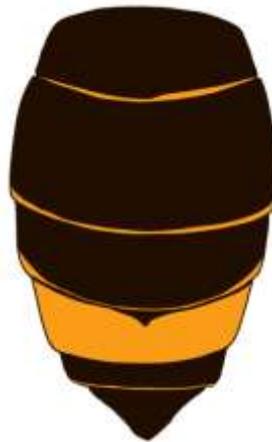


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Figure 1. The Asian hornet, *Vespa velutina nigrithorax* (Jean Haxaire)

colonies. Worker hornets predate a variety of insects to obtain a protein-rich diet required. Prey is often caught on-the-wing (Figure 3), but hornets also raid beehives. Mature nests, comprising several thousand individuals, are seen from May. Sexual stages appear between July-November, one colony producing hundreds or even thousands of mated queens. As the colony dies, these foundresses look for suitable places to hibernate, emerging the following spring to repeat the cycle.



Vespa crabro

Vespa velutina

Figure 2. Comparison between abdominal features of native *V. crabro* and Asian *V. velutina*

Distribution: *Vespa velutina* was accidentally introduced into France from Asia in 2003-2004. In less than a decade it has spread across much of France, entered Spain (2010), Belgium (2011), Portugal (2011/12) and Italy (2013). Readers need to be aware that there is clearly potential for this species to arrive and establish here. At the request of the Non Native Species Secretariat (NNSS) the NBU completed a detailed Risk Assessment for *V. velutina*, considering respective likelihoods of arrival, establishment and spread in GB, and its potential impact. Key findings are as follows:



Figure 3. A beehive under attack by the Asian hornet *V. velutina nigritorax* (Jean Haxaire)

How likely are Asian hornets to arrive in GB?

The life-stage that poses a risk is the mated queen; just one inseminated female will found an entire colony comprised of several thousand offspring. It is believed that the entire population of Asian hornets in France originated from a single incursion.

There are several pathways by which queens could arrive in GB (Table 1), but some are pose higher risks than others. At present the most likely route of entry considered is to be ‘under its own steam’. *Vespa velutina* has been present in northern coastal France since 2008 and, in theory, hornet queens could fly across the Channel which, at its narrowest, is 34km wide. It has been suggested that *V. velutina* may fly dozens of kilometres in one flight, with certain weather conditions assisting spread. There are numerous records of insects far less sturdy than hornets (butterflies, ladybirds etc.) making this journey each year, sometimes in vast numbers.

| Table 1. Entry Pathways by which the Asian hornet could enter the UK | |
|--|-------------------------------------|
| Pathway | Level of risk (likelihood of entry) |
| 1. Cross Channel flight | High |
| 2. Imported wood/wood products | High |
| 3. Imported man-made goods | Intermediate |
| 4. Imported fruit/cut flowers | Intermediate |
| 5. Imported soil | Low |
| 6. On freight containers/transport vehicles | Low |
| 7. Movement with honey bees | Extremely low |

How likely are Asian hornets to establish in GB? *Vespa velutina* is highly adaptable, readily establishing in many regions of France. Models predict that Occidental Europe (which includes GB) is climatically very suitable for this species. Since arrival in the EU, *V. velutina* has colonised urban/sub-urban, agricultural and wooded areas; all these habitats are equally available in GB. There is no evidence that the native European hornet or its natural enemies have had any impact on its establishment on the Continent. We conclude that the Asian hornet could readily establish in GB.

How easily could Asian hornets spread within GB? Adult hornets are highly mobile (speed of spread in France >100km/year). Suitable prey and habitats are present in many parts of GB, but potential for arrival and subsequent spread believed greatest in the following areas:

- Areas where winters are milder (southern English counties);
- Open areas near water, hornets tending to follow rivers and watercourses;
- Near ports and airports, where controlled and uncontrolled consignments of commodities that may harbour overwintering queens are most likely to enter the UK;
- In the event that *V. velutina* crosses the English Channel, either on shipping or by natural spread, coastal counties of southern England will be most at risk.

What would the impact of Asian hornets likely to be in GB? Honey bees are the primary managed pollinator of commercial crops in GB (total value 100s £m/annum). Honey production is worth up to £35m/annum. Any exotic pest that threatens national bee stocks will have negative economic impacts. The environmental impact of the Asian hornet in the EU has yet to be measured. However, research in France shows that it uses not just honey bees but also social wasps, other Hymenoptera, several types fly and various unclassified insects, which together provide unmanaged pollination services in a variety of man-made and 'wild' scenarios. In terms of social impacts, almost half (49%) of hornets' nests occur in urban/semi-urban environments, some being located <2m off the ground i.e. close to human activity. As a group, hornets use poisonous venoms rich in toxins, enzymes and biologically active peptides to overcome their prey. Generally, although very painful, the effects of Asian hornet stings on people are local and short-lived. However, in France three separate fatalities have been attributed to anaphylactic shock caused by *V. velutina* stings.

How you can help:

- Monitoring for arrival is strongly encouraged, especially in areas where likelihood of arrival is considered to be highest (S & SE England). This will make a significant contribution to the security of honey bee stocks and other insect pollinators predated by *V. velutina*.
- Make sure you know how to recognise Asian hornets – a helpful ID sheet can be downloaded from the NNSS website at <http://bit.ly/1e8Drio>
- Know where to report sightings: alert_nonnative@ceh.ac.uk
- You may consider hanging hornet traps, but please follow guidelines to make sure that you avoid trapping other insects (<http://bit.ly/1jsGV0j>).
- If you are a beekeeper, you need to register on BeeBase the NBUs database of beekeeping statistics – in the event that the Asian hornet arrives here, efforts to contain it will be seriously jeopardised if we don't know where vulnerable apiaries are located.

Further Information: The Asian hornet pages of our BeeBase website www.nationalbeeunit.com contains information about biology, Risk Assessment, monitoring for arrival and the Response Plan should it be found in the UK. Find more about the NNSS and the Asian hornet Risk Assessment for GB on their website: <http://bit.ly/I88Abr>. All entry pathways have been summarised in BeeCraft Magazine articles: Asian Hornet Risk Assessment September and October 2011 (<http://bit.ly/1aVLoTT>).

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