

# Engaging people in recording alien species

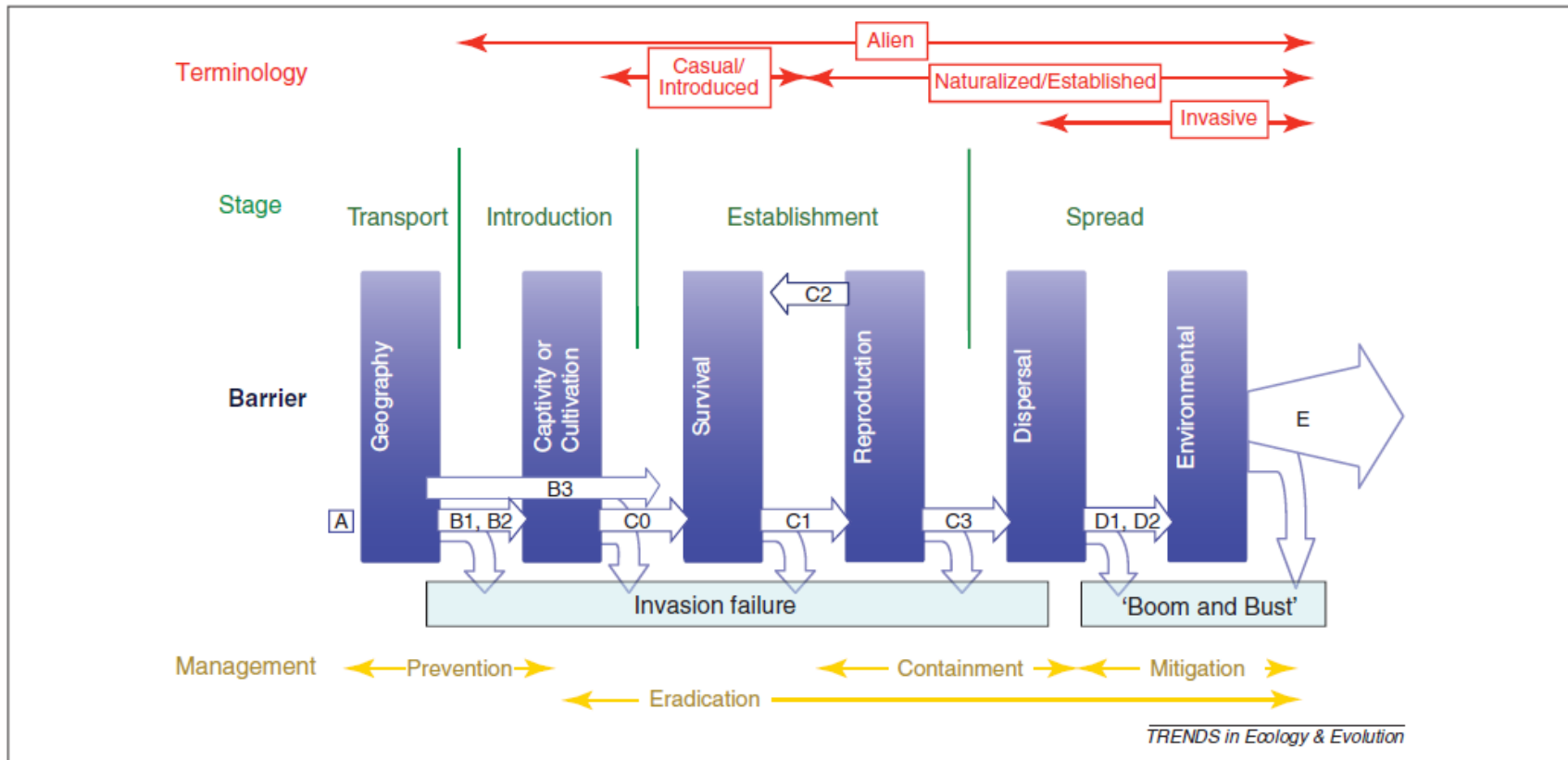
Helen Roy



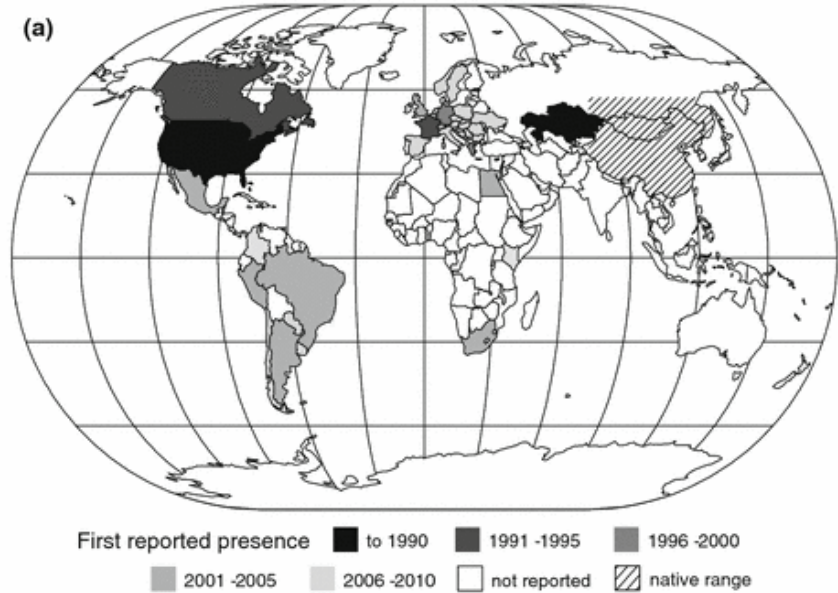
# Understanding invasions

Opinion

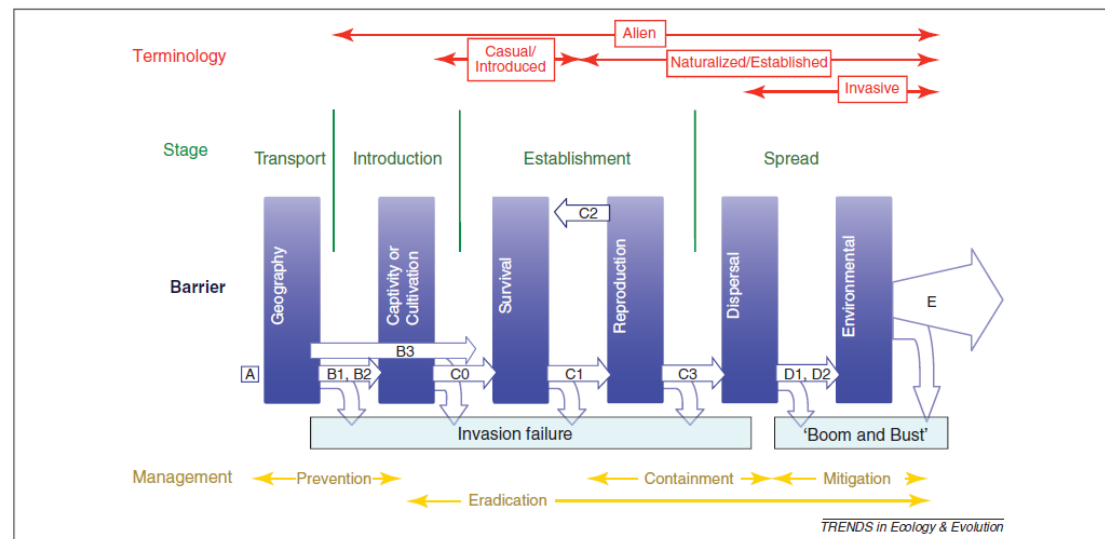
*Trends in Ecology and Evolution* July 2011, Vol. 26, No. 7



# Global invasion by *Harmonia axyridis*



Brown et al. (2011) *BioControl*



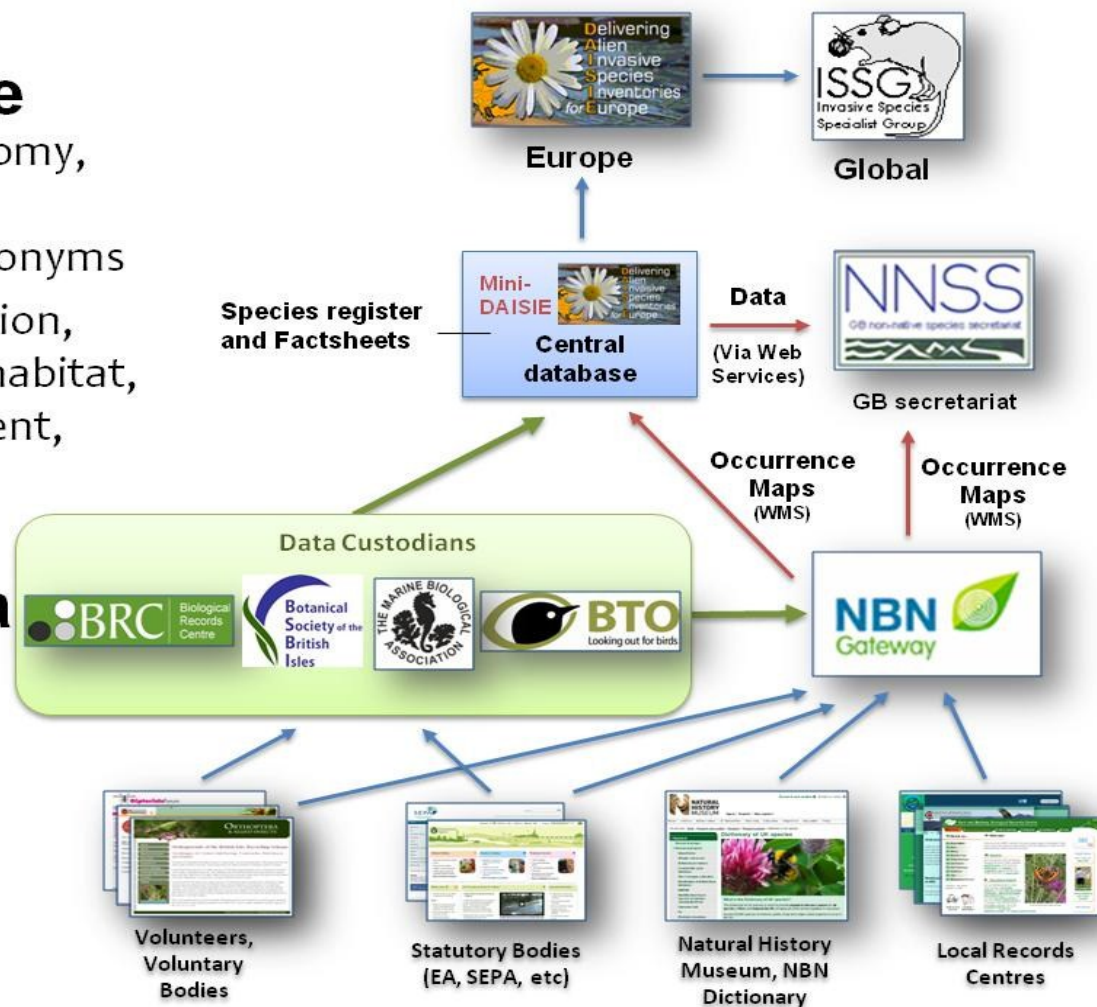
# GB Non-Native Species Information Portal

## Central Database

- **Species register** – taxonomy, dates and pathways of introduction, habitat, synonyms
- **297 factsheets** – description, photo, biology, ecology, habitat, range, impact, management, bibliography

## Occurrence data

- **NBN Gateway**





**1919 established alien  
species in GB**



# Scorecard 2014 for Great Britain

- 1494 established non-native plants
- 420 established non-native animals
- 234 established non-native species designated as having negative ecological or human impact:
  - 96 (6.4%) established non-native plants
  - 136 (32.4%) established non-native animals

Roy et al. (2014) *Biological Invasions*

# ALIEN



# Challenge



COST is supported by the EU  
RTD Framework Programme



ESF provides the COST Office  
through an EC contract

COST / COST TD1209

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...to facilitate enhanced knowledge gathering and sharing through a network of experts, providing support to a European IAS information system which will enable effective and informed decision-making in relation to IAS

- Networking
- Workshops
- Short Term Scientific Missions



# A ladybird perspective



Jennifer Lewington



# *Harmonia axyridis*



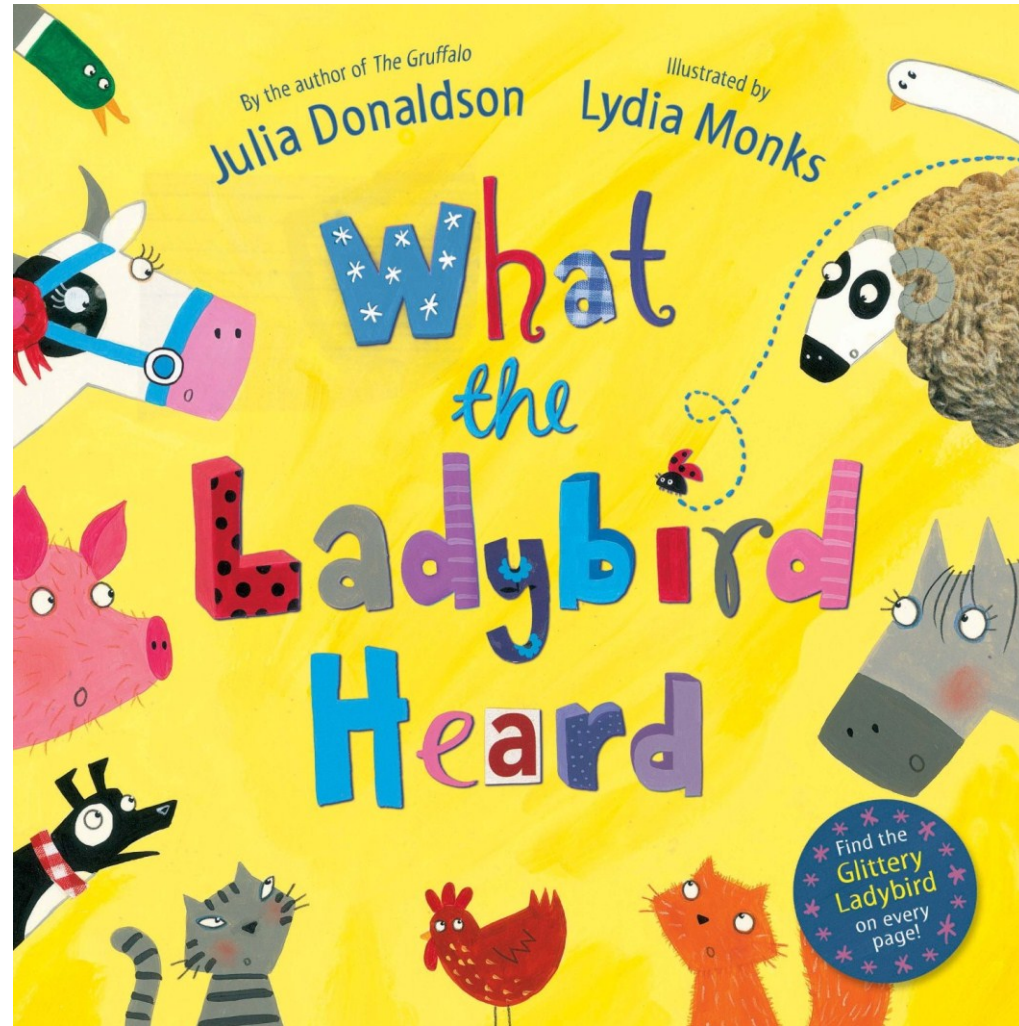
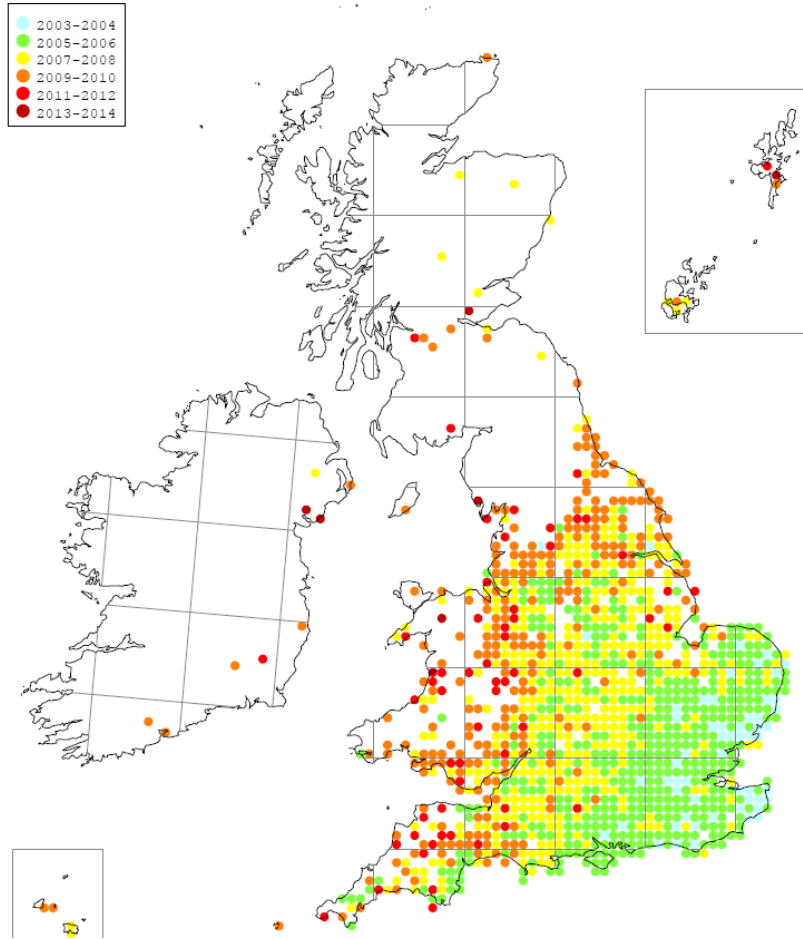
**“The Ladybird has Landed!**

A new ladybird has arrived in Britain. But not just any ladybird: this is *Harmonia axyridis*, the most invasive ladybird on Earth.”

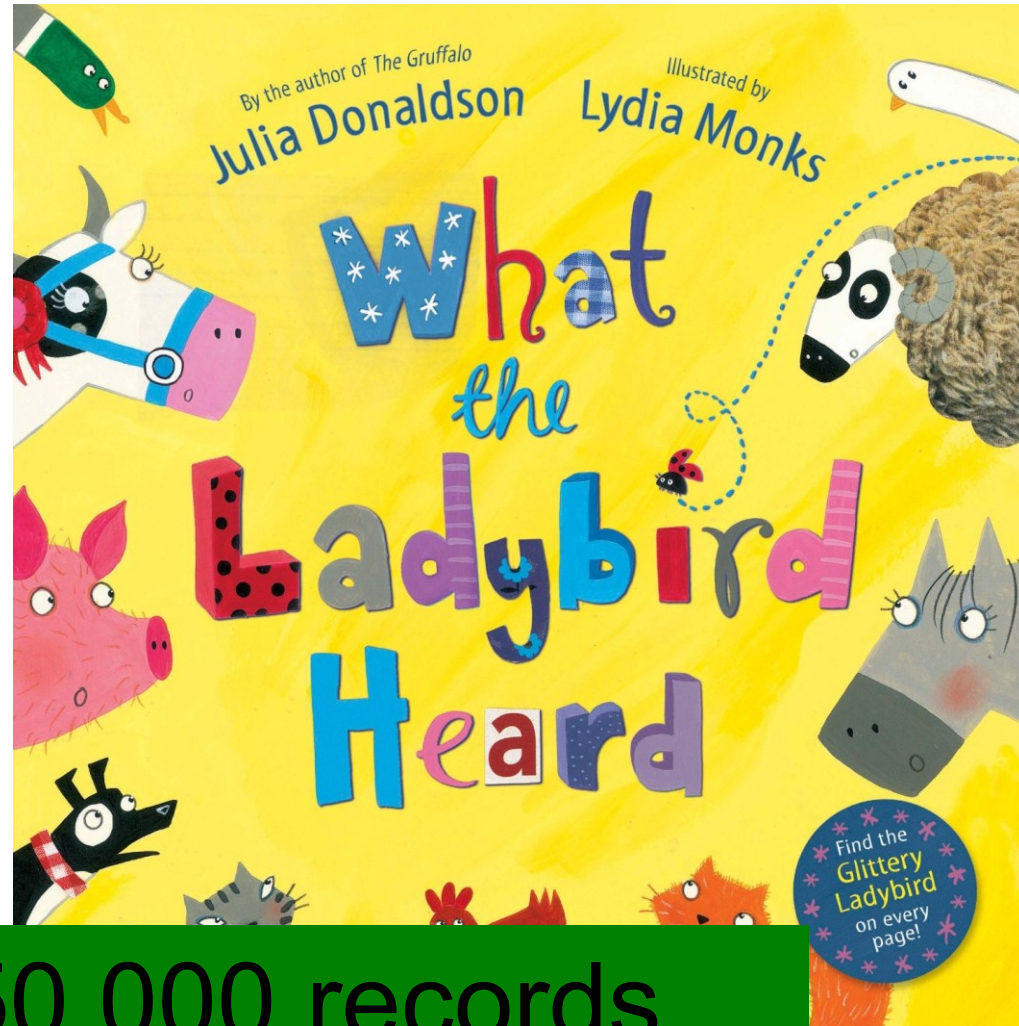
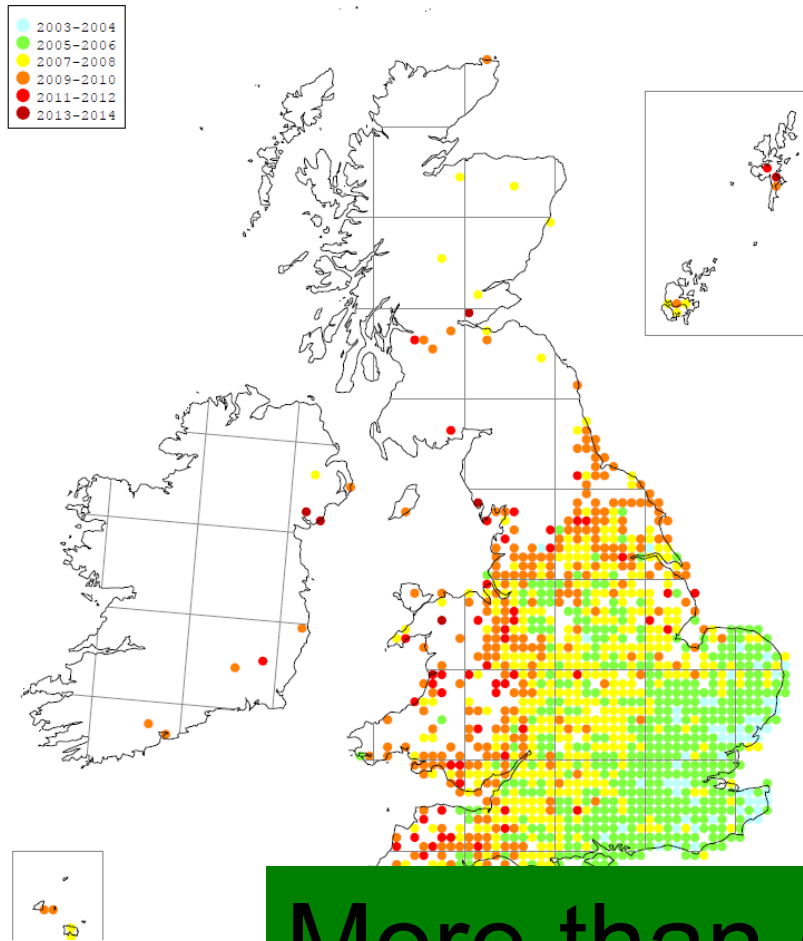
Press Release  
5<sup>th</sup> October 2004



# Understanding invasions



# Understanding invasions



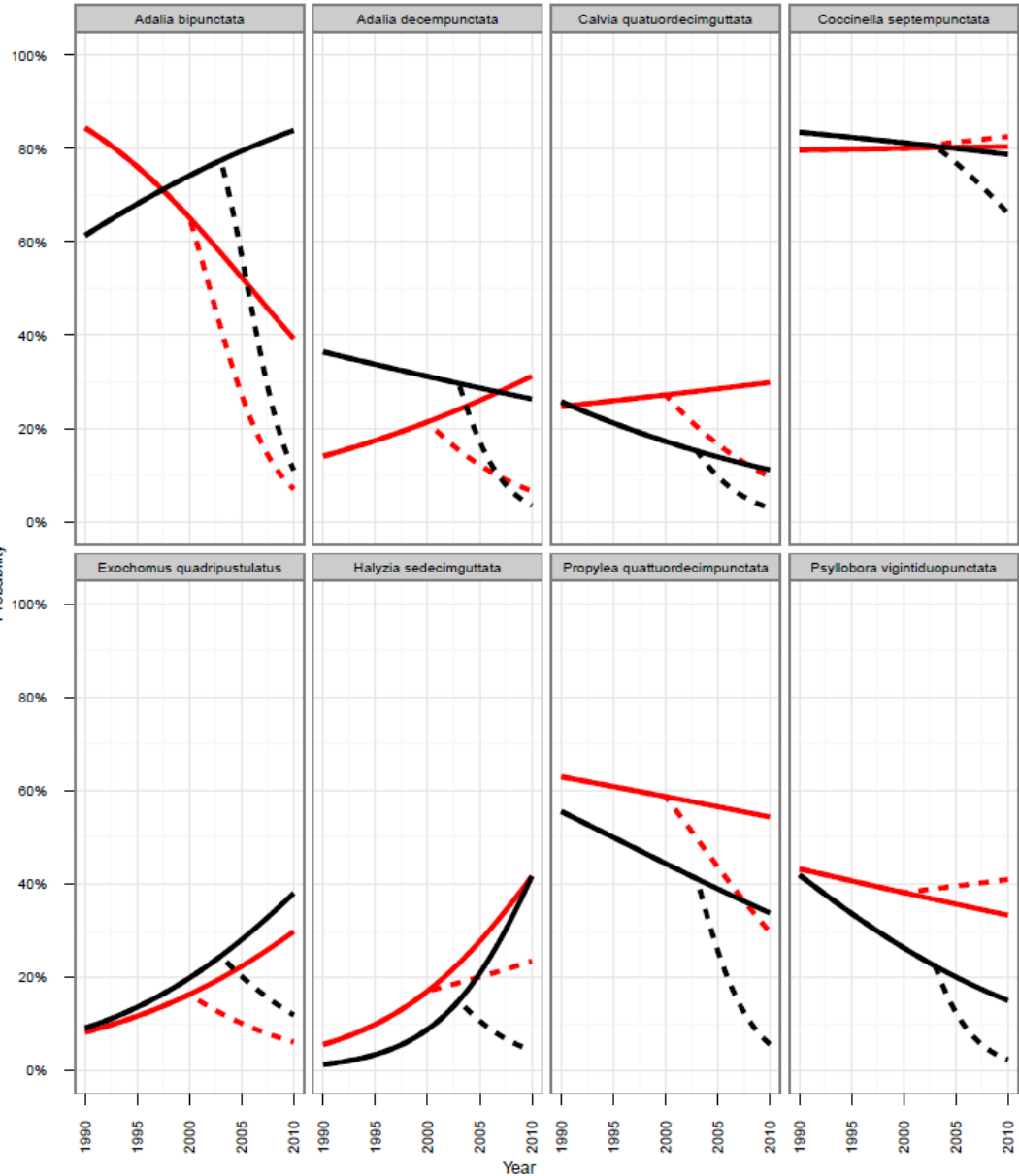
More than 50 000 records



# One winner, one thousand losers

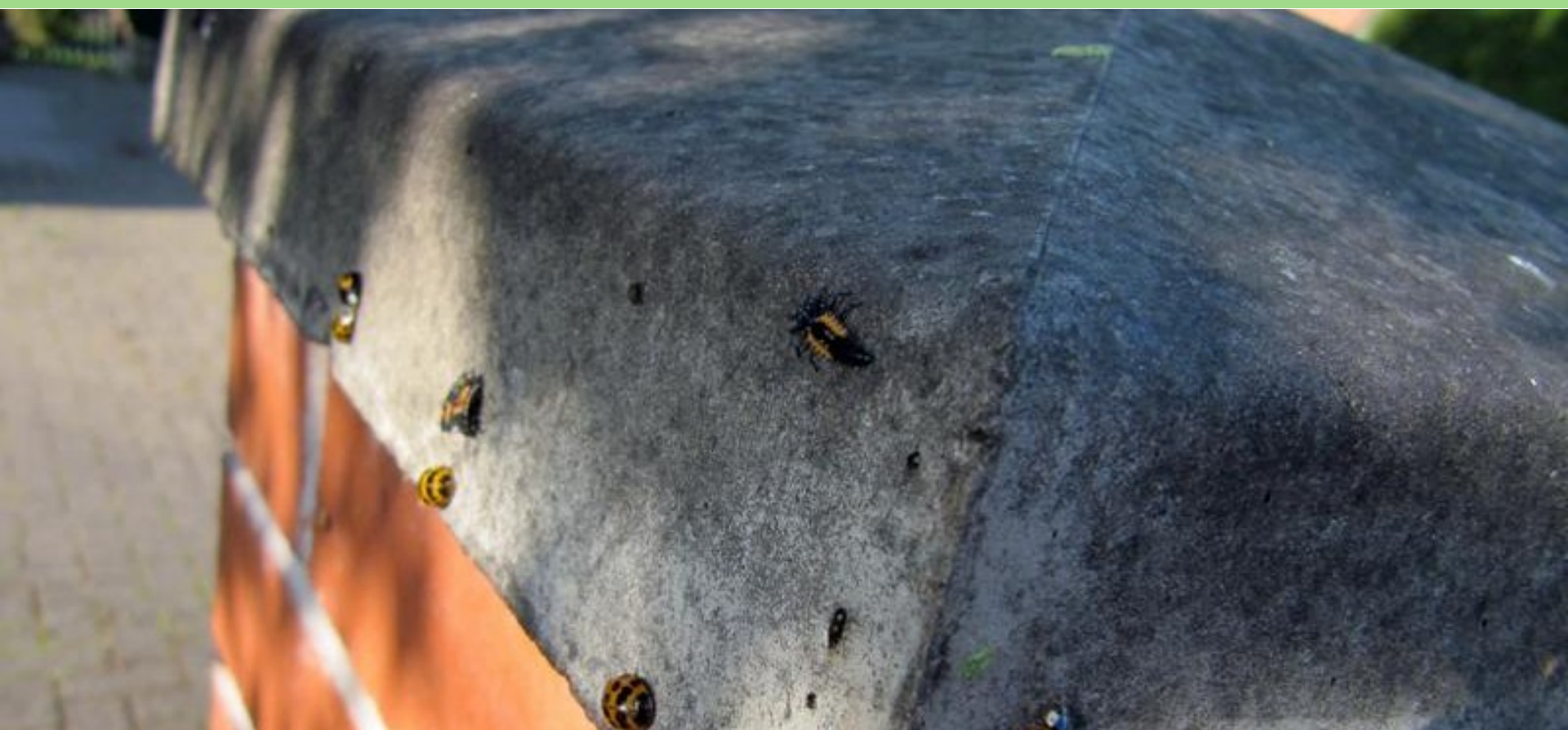


# Declines in native ladybirds





# Linking trends with traits, climate and habitat



Biol Invasions  
DOI 10.1007/s10530-013-0628-3

ORIGINAL PAPER

## Ecological correlates of local extinction and colonisation in the British ladybird beetles (Coleoptera: Coccinellidae)

Richard F. Comont · Helen E. Roy ·  
Richard Harrington · Christopher R. Shortall ·  
Bethan V. Purse



# Escape from natural enemies

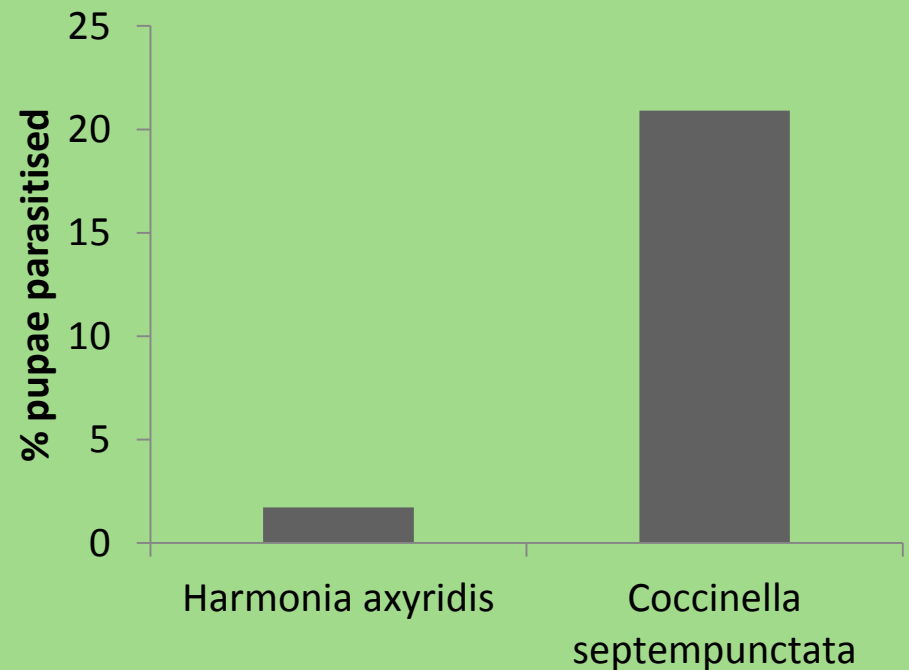
*Insect Conservation and Diversity* (2013) doi: 10.1111/ica.12060

## Escape from parasitism by the invasive alien ladybird, *Harmonia axyridis*

RICHARD F. COMONT,<sup>1,2</sup> BETHAN V. PURSE,<sup>1</sup> WILLIAM PHILLIPS,<sup>3</sup> WILLIAM E. KUNIN,<sup>4</sup> MATTHEW HANSON,<sup>4</sup> OWEN T. LEWIS,<sup>2</sup> RICHARD HARRINGTON,<sup>5</sup> CHRISTOPHER R. SHORTALL,<sup>5</sup> GABRIELE RONDONI<sup>6</sup> and HELEN E. ROY<sup>1</sup> <sup>1</sup>NERC Centre for Ecology & Hydrology, Oxfordshire, UK, <sup>2</sup>Department of Zoology, University of Oxford, Oxford, UK, <sup>3</sup>4 Archer Close, Gorse Meadow, Loughborough, UK, <sup>4</sup>School of Biology, Faculty of Biological Sciences, University of Leeds, Leeds, UK, <sup>5</sup>Rothamsted Insect Survey, Department of AgroEcology, Rothamsted Research, Harpenden, UK and <sup>6</sup>Department of Agricultural and Environmental Sciences, University of Perugia, Perugia, Italy



**Abstract.** 1. Alien species are often reported to ally similar species native to the invaded range densities, and a tendency to become invasive. (ERH) explains the success of invasive alien species reduced mortality from natural enemies (predators compared with native species. The harlequin ladybird species alien to Britain, provides a model system for 2. Pupae of *H. axyridis* and the native ladybird monitored for parasitism between 2008 and 2011, in central England in areas first invaded by *H. axyridis*. In addition, a semi-field experiment was established to test parasitism of adult *H. axyridis* and *C. septempunctata*. 3. *Harmonia axyridis* pupae were parasitised at significantly lower rates in the native range, and both pupae and adult parasitism rates were significantly lower in the native range (1.67% for *H. axyridis*; 18.0% for *C. septempunctata* in the native range; 2–7% for Asian *H. axyridis* (2–7%). We found no evidence that parasitism affected the parasitism rate of *C. septempunctata* by 4. Our results are consistent with the general prediction that parasitism by natural enemies is lower for introduced species than for native species. This may partly explain why *H. axyridis* is so successful in its new range. **Key words.** *Coccinella septempunctata*, enemy release hypothesis, invasive alien species, native species, natural enemies.



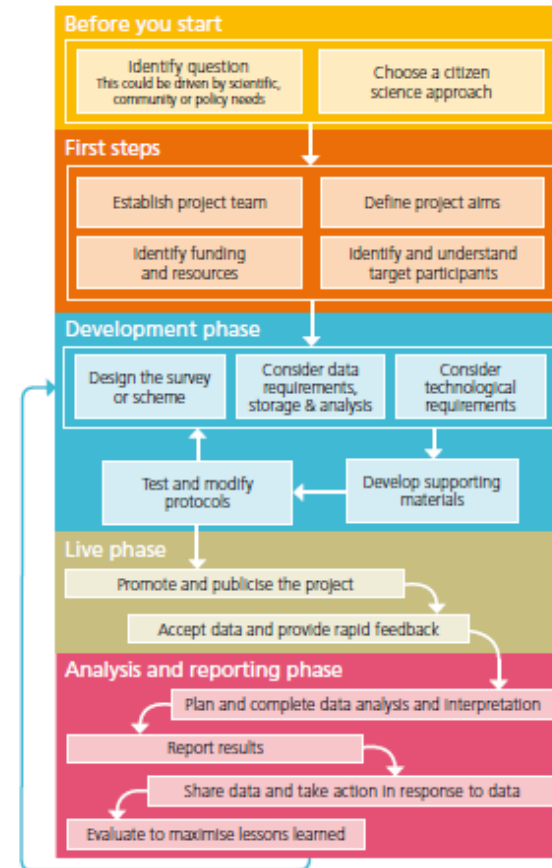
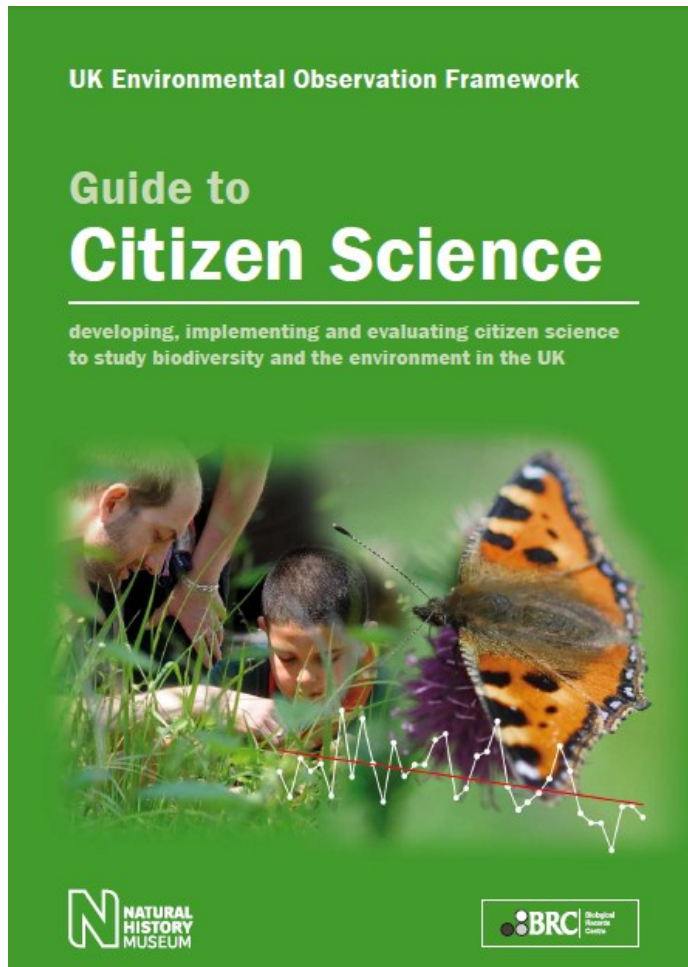
# Does colour form influence spread?



Colour morphs spread to similar extents though increased sunshine significantly enhanced the spread of form *succinea*



# Citizen science perspectives



# Establish the project team



**British Bugs** An online identification guide to UK Hemiptera



**amphibian and reptile  
conservation**



Department  
for Environment  
Food & Rural Affairs



# Define project aims

**Invasive non-native species are considered to be one of the greatest threats to biodiversity and also impact on the economy and society.**

**Over the last century there has been a dramatic increase in the movement of non-native species around the world. The total for Britain is estimated to be in excess of 2500 established species. Some of these non-native species create serious problems hence the term "invasive non-native species".**

## What can you do?

The RISC (Recording Invasive Species Counts) project has been developed to increase participation in recording invasive non-native species and to encourage greater understanding of them. It is contributing to our understanding of the distribution and ecology of a number of invasive non-native species.

Record your sightings and upload your photos at [www.nonnativespecies.org/recording](http://www.nonnativespecies.org/recording)

RISC is co-ordinated by the National Biodiversity Network and Biological Records Centre (part of the Centre for Ecology & Hydrology), in partnership with recording schemes for the invasive animals and plants. The project is funded by Defra.

**RISC**  
RECORDING INVASIVE SPECIES COUNTS

**What are invasive non-native species?**

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- 1 Western conifer seed bug *Leptoglossus occidentalis*
- 2 Rhododendron leafhopper *Graphocephala fennahi*
- 3 Water primrose *Ludwigia grandiflora*
- 4 Muntjac deer *Muntiacus reevesi*
- 5 American skunk cabbage *Lysichiton americanus*
- 6 Chinese mitten crab *Eriocheir sinensis*
- 7 Zebra mussel *Dreissena polymorpha*
- 8 American bullfrog *Lithobates catesbeianus*
- 9 Water fern *Azolla filiculoides*
- 10 Floating pennywort *Hydrocotyle ranunculoides*
- 11 Citrus longhorn beetle *Anoplophora chinensis*
- 12 Tree of heaven *Ailanthus altissima*
- 13 Southern green shieldbug *Nezara viridula*
- 14 Wakame *Undaria pinnatifida*



RISC = 6 species

RISC + ALERT = 21 species



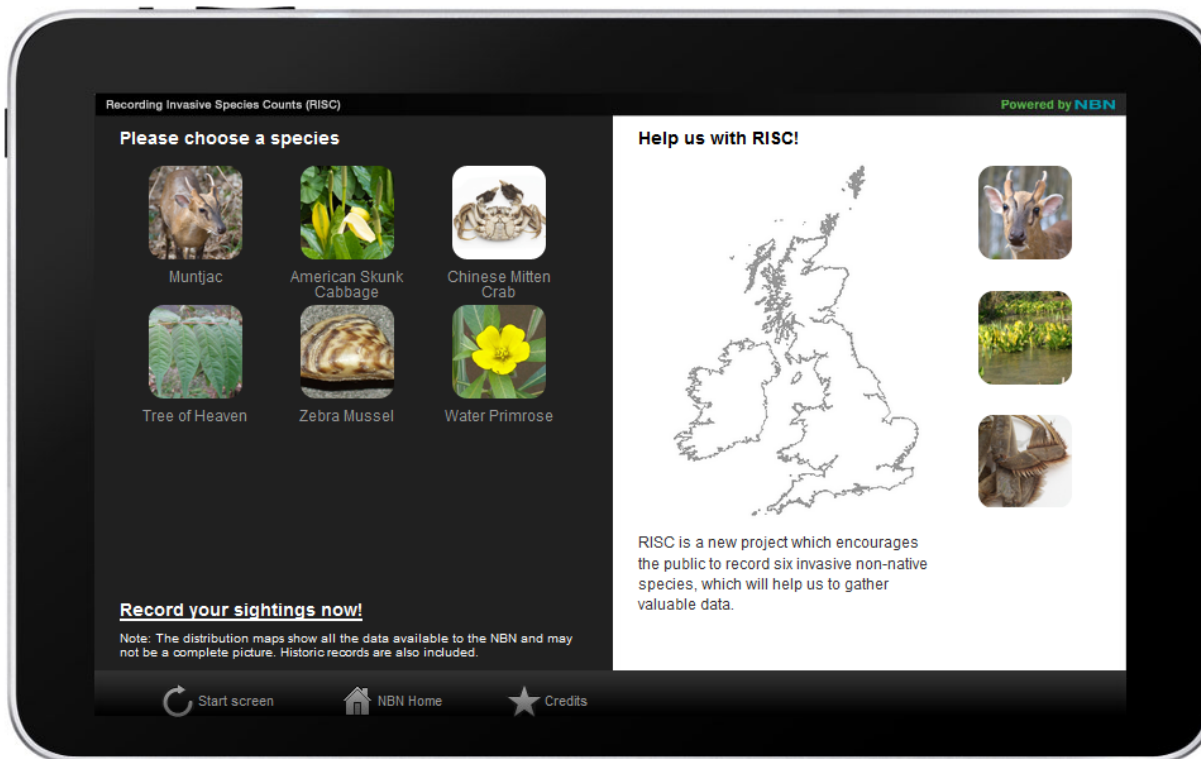


# Identify and understand target participants



# Design the scheme

RISC



## Help us with RISC!

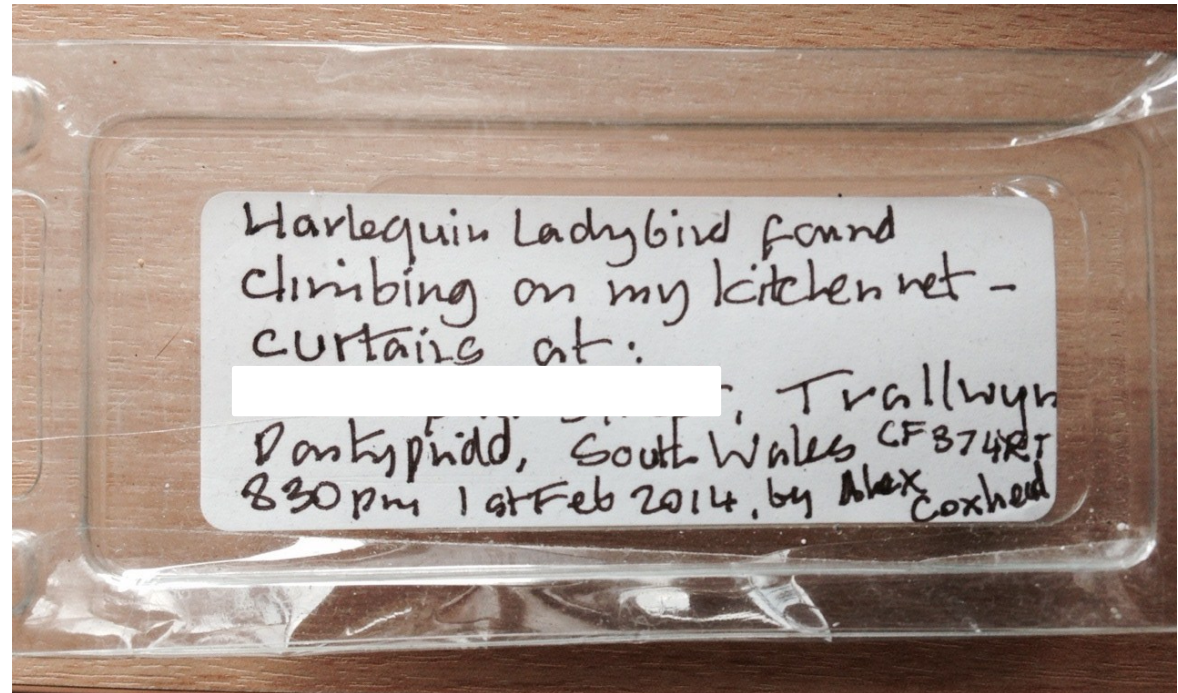
A new project to involve the public in recording six invasive non-native species has recently launched. The aim of the project is to raise awareness of non-natives and to help us to gather valuable data.

Recording Invasive Species Counts (RISC) is funded by Defra and is being run by the NBN, the Centre for Ecology and Hydrology, Anglia Ruskin University and the GB Non-native Species Secretariat.



# Non-Native Species Recording

- On-line
- Apps
- E-mails
- Social media
- Letters





# Promote and publicise

## Attack of the aliens

From green parakeets to grey squirrels, and tree fungi to water weeds, invasive non-native species are driving many British plants and animals to the brink of extinction. **Lucy Siegle** reports on the very real threat to our biodiversity – and reveals how you can help

Battle for the treetops: the grey squirrel first arrived in Britain 150 years ago. Since then it has all but eradicated its native red cousin





# Provide feedback

## CASES OF MISTAKEN IDENTITY

# The Asian Hornet

Gay Marris (National Bee Unit) and Helen Roy (NERC Centre for Ecology & Hydrology)

**W**ith the threat of the invasive Asian hornet (*Vespa velutina*; AH) arriving in the UK from continental Europe, the National Bee Unit (NBU) has been working with colleagues in the Non-Native Species Secretariat (NNS), the Centre for Ecology & Hydrology (CEH) and Bee Health Policy (BHP) to raise awareness of this potentially damaging predator of honey bees and other pollinating insects (<https://secure.fera.defra.gov.uk/beebase/index.cfm?pageid=208>).

We have been urging all members of the public (beekeepers or otherwise) to report suspect sightings to the GB Non-Native Species Information Portal (GB-NNSIP), led by CEH and hosted by NNS, alert e-mail system (alert\_nonnative@ceh.ac.uk) and are encouraging the use of hanging traps to monitor for arrival.

When reporting suspect sightings the public are asked to provide as much detail as they can about the insect they have seen/ found and, whenever possible, supply digital photographs – these are a very useful aid to identification. Sightings and alert e-mails are picked up by Dr Helen Roy, principal scientist at the CEH



The European hornet, *Vespa crabro*

and, if necessary, referred to the NBU for confirmatory diagnosis.

People from across the country have been very concerned by the threat posed by *V. velutina* and have responded diligently to the request for information and we have received almost 80 suspect reports. Thankfully, to date, all of these have proved to be other types of insect, but each report is taken seriously.

We work together, not just to rule out that any given specimen is *V. velutina*, but also to establish its true identity. We forward the information to experts (coordinators of national recording schemes or societies hosted by the Biological Records Centre, [www.brc.ac.uk](http://www.brc.ac.uk)) who compile records of the particular species and so the information is extremely valuable in many regards.

This article provides a brief overview of some of those species which comprise cases of mistaken identity reported since 2011.

### The European Hornet (*Vespa crabro*)

This is the number one case of mistaken identity. There are probably two reasons for this: firstly, it is the only native hornet species and, superficially, bears some resemblance to *V. velutina*; secondly, given the fearsome reputation of the Asian hornet, there may be a perception that it must be a large hornet and the queens of *V. crabro* are, indeed, impressive. However, in spite of the impact of Asian hornets on other insects and the very painful stings they may inflict on people, they are smaller and less physically impressive than their European counterpart.

Key differences between the European hornet and Asian hornet are that the latter is smaller, has characteristic yellow legs, a dark velvety thorax and a dark abdomen with a distinctive yellow band on the fourth segment. Asian Hornets are never active at night whereas European Hornets may be. Their lifecycle is similar to that of the Asian hornet (and other social wasps):

- mated queens emerge in early spring and form embryo nests
- large nests are rapidly established and worker hornets attend to the needs of the growing colony
- workers are extremely active and predate a variety of insects to obtain the protein-rich diet that the developing hornet brood requires
- mature hornet nests are hard to spot, but are most likely to be seen from early summer
- sexual stages emerge later and result in the production of mated queens
- as the colony dies (in late autumn), these foundresses, which use high energy sugar-rich food sources such as fruits and nectar, seek out suitable sites in which to overwinter
- foundresses emerge the following spring to begin the cycle again.



Keep your eyes open for the Asian hornet. To help, we have details of some of its lookalikes



# Provide feedback

Thank you so much for your e-mail. We are receiving lots of reports of native species that look like Asian hornets at the moment and I am pleased to say that the photograph you have sent is a native species – the European Hornet, *Vespa crabro* ([http://www.bwars.com/sites/www.bwars.com/files/info\\_sheets/Vespa-crabro-info-sheet.pdf](http://www.bwars.com/sites/www.bwars.com/files/info_sheets/Vespa-crabro-info-sheet.pdf)).

Thank you again for your report – such reports are extremely useful for non-native species surveillance. Please do report future sightings of concern by either e-mailing this address or using the on-line form:

[http://www.brc.ac.uk/risc/alert.php?species=asian\\_hornet](http://www.brc.ac.uk/risc/alert.php?species=asian_hornet)

For an overview of the Asian Hornet and its status in GB please see:

<https://secure.fera.defra.gov.uk/nonnativespecies/factsheet/factsheet.cfm?speciesId=3826>

For detailed information and help on identification of the Asian Hornet please also see the following factsheet:

<https://secure.fera.defra.gov.uk/beebase/downloadDocument.cfm?id=698>

Very best wishes, Helen

# Analyse, interpret and respond

**CHECK**

**Check** your equipment and clothing for live plants and animals - particularly in areas that are damp or hard to inspect.

**CLEAN**

**Clean** and wash all equipment, footwear and clothing thoroughly.

If you do come across any plants or animals, leave them at the water body where you found them.

**DRY**

**Dry** all equipment and clothing - some species can live for many days in moist conditions.

Make sure you don't transfer water elsewhere.




Search

## Recording Invasive Species Counts

Here is a summary of records received through the project Recording Invasive Species Counts. For more information: <http://www.nonnativespecies.org/recording>

If you have just submitted records, please note that it can take a few minutes for your records to appear on the reports.

To see records associated with a specific dot on the map - Select the  icon, click on the dot and then select the "Records" tab to see the filtered records.

[Map](#) [Records](#) [Summary](#)

Taxon	Absence records	Submitted records	Verified records	Awaiting verification
Muntjac	0	704	677	0
Leptoglossus occidentalis	0	433	379	22
Asian Hornet	0	329	0	5
Chinese Mitten Crab	0	217	208	1
Skunk Cabbage	0	162	87	0
Himalayan Balsam	0	92	21	2
Nezara viridula	0	85	16	10
Graphocephala fennahi	0	41	30	4
Signal Crayfish	0	40	14	0
Wakame	0	28	27	0
Tree of Heaven	0	26	5	1
Floating Pennywort	0	23	4	0
Water Fern	0	15	1	0
Oak Processionary Moth	0	10	1	0
American Bullfrog	0	10	0	1
Zebra Mussel	0	10	8	2
Rhododendron	0	8	2	0
Killer Shrimp	0	7	1	2
Monk Parakeet	0	6	2	0
Carpet Sea-squirt	0	4	0	0

[first](#) [prev](#) [1](#) [2](#) [3](#) [4](#) [5](#) [6](#) [next](#) [last](#)


Showing records 1 to 20 of 2270

Search

## Non-Native Species ALERT

Here is summary of records received for non-native species which are part of the GB rapid response protocol. For more information: <http://www.nonnativespecies.org/alerts/index.cfm>

If you have just submitted records, please note that it can take a few minutes for your records to appear on the reports.

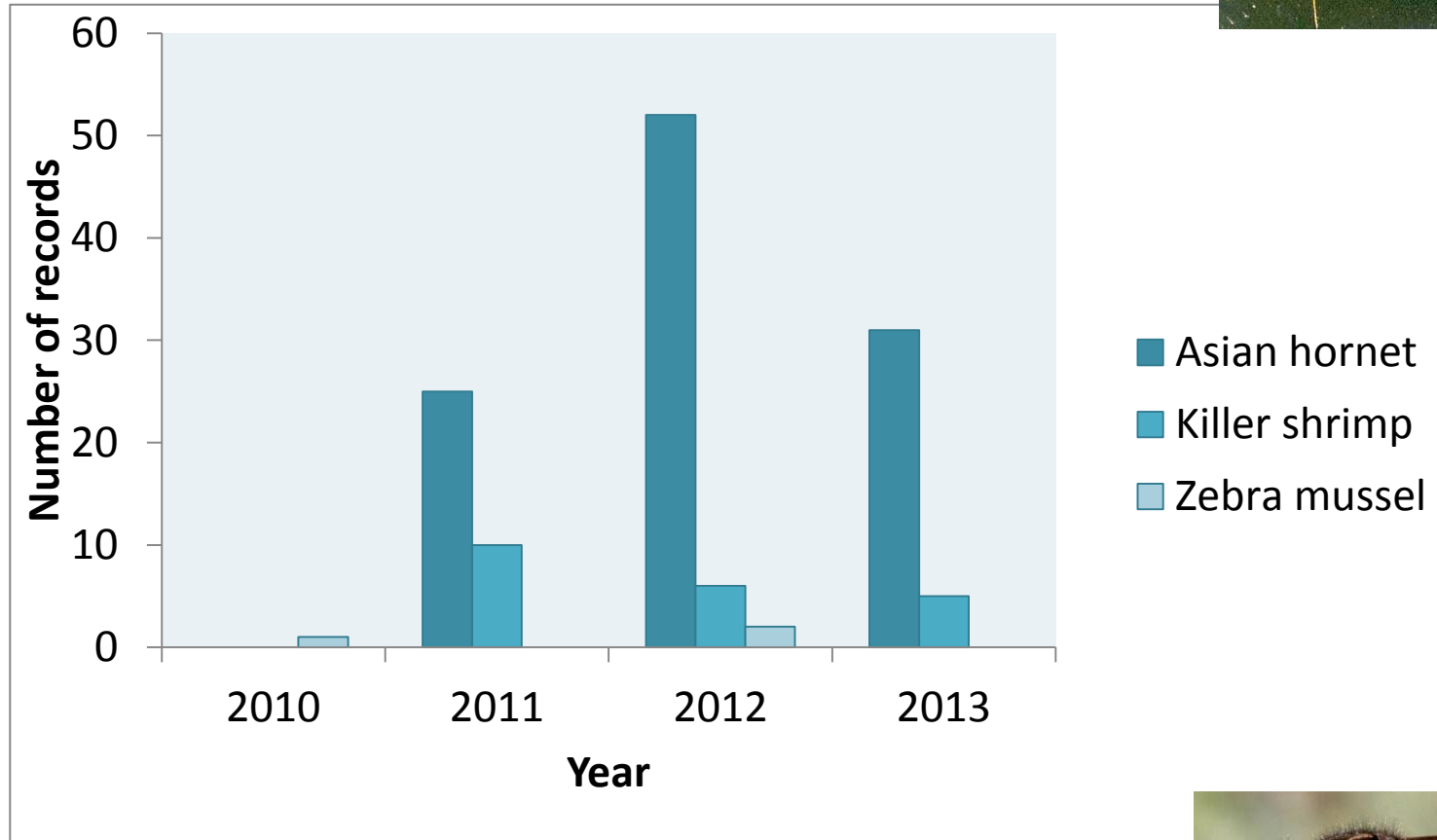
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Map **Records** Summary

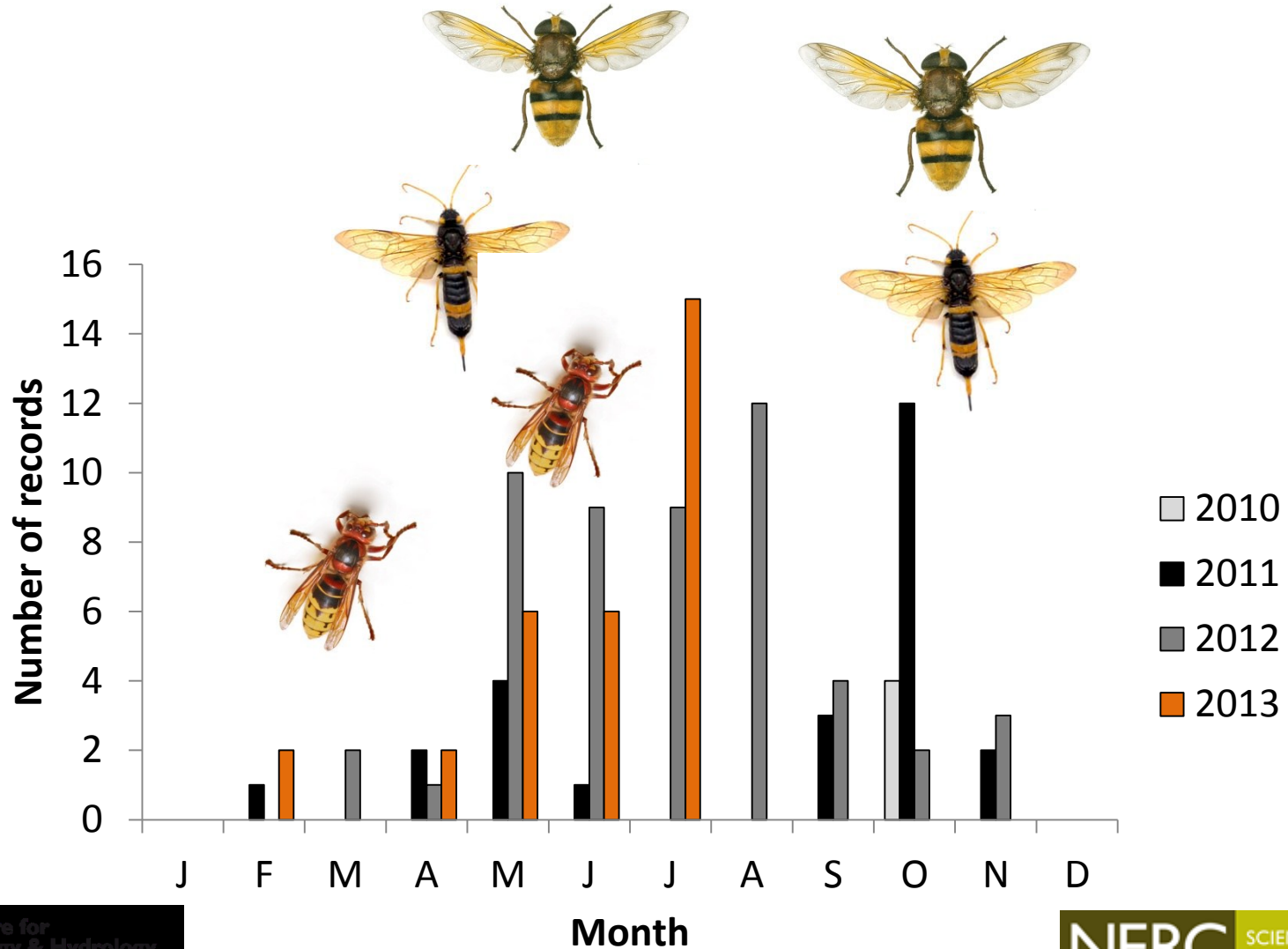
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Killer Shrimp	0	7	1	2
Monk Parakeet	0	6	2	0
Carpet Sea-squirt	0	4	0	0
Indian House Crow	0	4	0	0
Sacred Ibis	0	2	2	0
Topmouth Gudgeon	0	1	0	0
Prairie Dog	0	1	1	0

Showing records 1 to 9 of 4





# Asian hornets...not what they seem





# Share data



[Login](#)

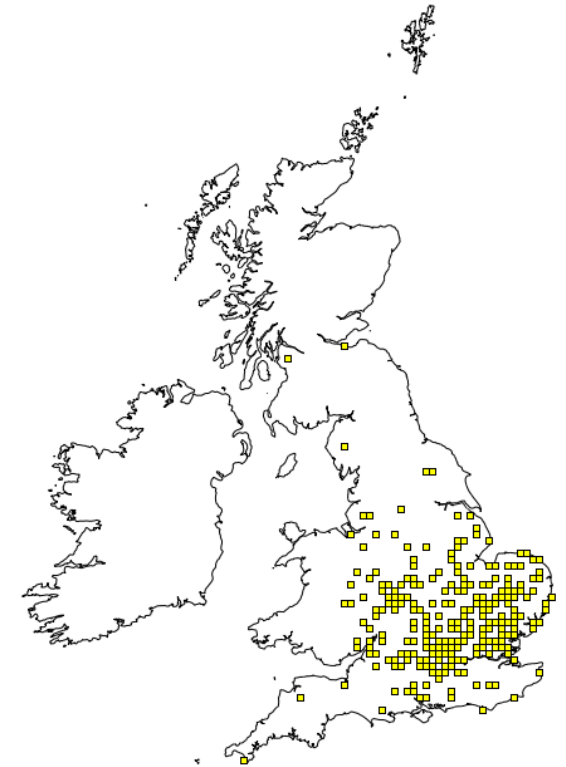
Search the NBN Gateway

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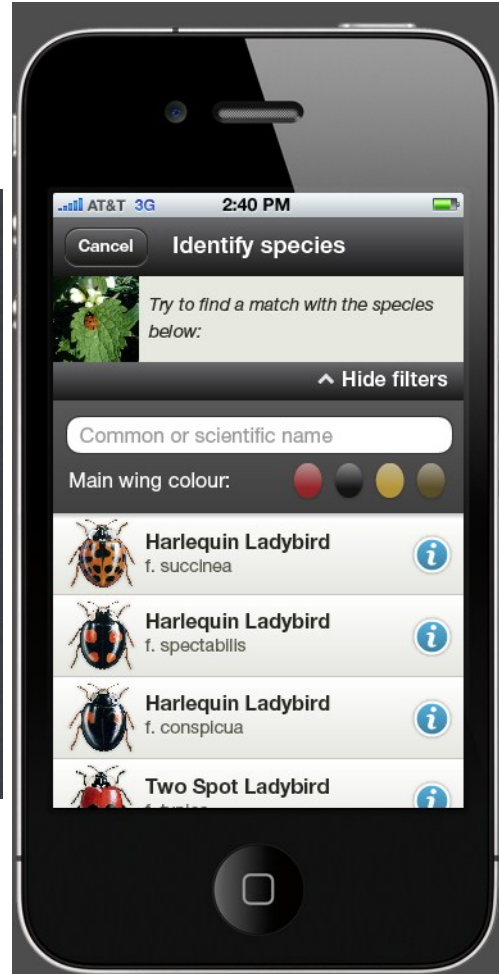
You are here: [Datasets](#) > [RISC Non-Native Species Records for Muntjac](#)

## RISC Non-Native Species Records for Muntjac

General	Access and constraints	Geographical	Temporal	Surveys	Attributes	Species
<b>Provider</b>	Biological Records Centre					
<b>Title</b>	RISC Non-Native Species Records for Muntjac					
<b>Permanent key</b>	GA001158					
<b>Description</b>	Recording Invasive Species Counts ( <a href="http://www.nonnativespecies.org/recording/">www.nonnativespecies.org/recording/</a> ) was launched in 2010 and includes on-line recording for 19 species including: Muntjac, <i>Muntiacus reevesi</i> <a href="https://secure.fera.defra.gov.uk/nonnativespecies/factsheet/factsheet.cfm?speciesId=2263">https://secure.fera.defra.gov.uk/nonnativespecies/factsheet/factsheet.cfm?speciesId=2263</a> The data is predominantly provided by members of the public but records are verified from photos by designated experts. The recording form includes the option to provide abundance.					
<b>Date uploaded</b>	05-Aug-2014					
<b>Purpose of data capture</b>	The records were collected through the Recording Invasive Species Counts project which was launched in 2010 as a partnership between the NBN, BRC and associated recording schemes and societies. The Muntjac data was collated in conjunction with The Mammal Society and the Peoples Trust for Endangered Species. RISC was established in raise awareness of invasive non-native species and to increase distribution data for a selection of species considered to meet a number of criteria which ensured their suitability for recording by the public. Increasing the availability of distribution data is an important component of the Non-Native Species Framework Strategy for Great Britain ( <a href="http://www.nonnativespecies.org/">www.nonnativespecies.org/</a> ).					
<b>Methods of data capture</b>	The data is collected by members of the public reporting their sightings through an on-line recording form (powered by Indicia). The records are casual observations. Records submitted with a photograph are verified by a designated expert and only these records are included within the dataset.					
<b>Geographical coverage</b>	The geographic extent of the RISC dataset is GB. Ireland records non-native species through Invasive Ireland. The majority of records in this dataset are collated with six figure grid-references.					
<b>View in interactive map</b>	<a href="#">Map link</a>					
<b>Temporal coverage</b>	RISC has been promoted both during the initial launch phase and subsequently through conference talks and media attention. Additionally RISC includes mostly high profile species. Therefore, recording activity is likely to have been maintained at a high level. All the records have a full date (DD/MM/YYYY).					
<b>Data quality</b>	The data should be regarded as accurate because of the verification and validation mechanisms.					
<b>Additional information</b>	Muntjac is included within the GB Non-Native Species Information Portal as a factsheet: Muntjac, <i>Muntiacus reevesi</i> <a href="https://secure.fera.defra.gov.uk/nonnativespecies/factsheet/factsheet.cfm?speciesId=2263">https://secure.fera.defra.gov.uk/nonnativespecies/factsheet/factsheet.cfm?speciesId=2263</a>					
<b>Number of records</b>	692					
<b>Number of species</b>	1					

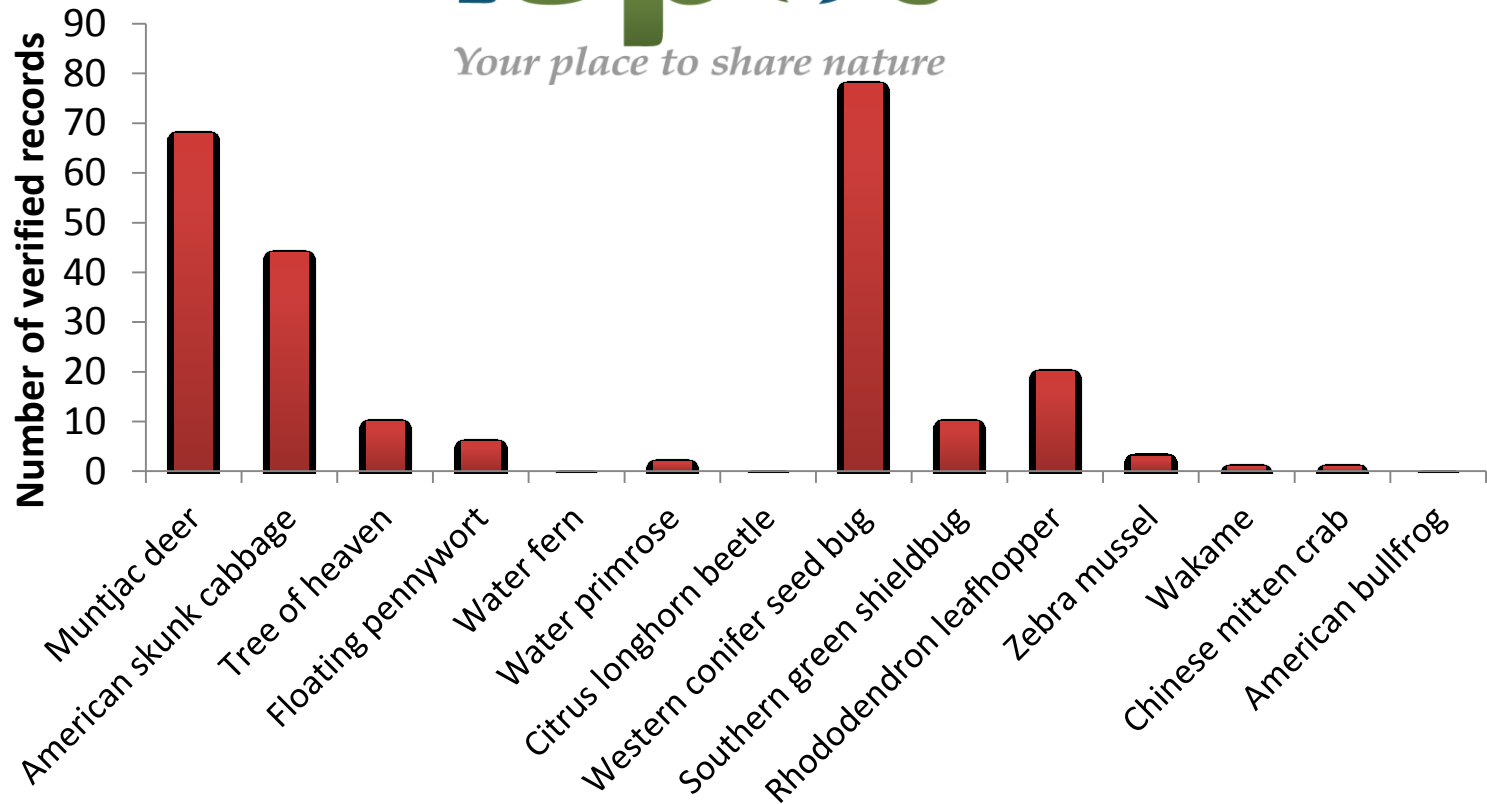


# Review and adapt





# Review and adapt



- 18,377 observations of 1,159 non-native taxa
- 5,200 observations of 185 taxa with negative ecological or human impact

# The experts (volunteers)...



# Top 10 – Asian hornet



*Vespa velutina*

Terrestrial predator

Native to China

Arrived in pottery  
consignment

Bordeaux, France in  
2004





## Alien that out mussels natives is top threat to British shores

Raccoon, ibis and Asian hornet are also listed as menace to indigenous species

**TOM BAWDEN**  
ENVIRONMENT EDITOR

A black-and-white mussel that is native to the Black Sea and poisons water has been identified as the species most likely to invade the UK and wreak havoc on the environment.

Researchers from 21 institutions have unanimously voted the quagga mussel, which is now well established in the Netherlands, as posing the greatest threat to Britain's

ecosystems among those species which have yet to reach the UK but are expected to arrive in the next few years.

The mussel – officially known as *Dreissena rostriformis bugensis* – is thought likely to enter the country on canoes, sailing dinghies or in the ballast water of ships.

The mussel, known in ecology circles as an “ecosystem engineer” because of its transformative impact on the environment, is just the size of a thumbnail, but clus-



ters can grow metres thick. It is a menace on a number of fronts, according to Dr Helen Roy, of the Centre for Ecology and Hydrology who led the research project.

Much of the damage quagga mussels inflict derives from their eating habits; they filter the water through their system to extract the food and discard unwanted matter in the form of “pseudofaeces”.

The filtering process removes valuable food needed by other species, creates poi-

sonous waste and radically alters the chemical composition of the water.

“Quaggas are prodigious water filterers, removing substantial amounts of phytoplankton – or algae – from the water. The pseudofaeces that is produced from filtering the water accumulates and creates a foul environment, containing pollutants which can be passed up the food chain,” said Dr Roy.

“The filtration of the water increases its transparency,

which increases light penetration and causes a proliferation of aquatic plants that can change species dominance and alter the entire ecosystem,” Dr Roy added. The mussel also clogs up pipes.

The report, which also includes contributions from Cambridge University, the Natural History Museum, the Royal Horticultural Society and the Zoological Society of London, analysed 591 non-native species that are expected to enter the UK in the

Quagga mussels and raccoons could flourish at the expense of native species

KYNDELL  
HARKNESS/  
MINNEAPOLIS  
STAR TRIBUNE/  
ZUMAPRESS.COM;  
AFP/GETTY

next decade. While the majority posed no environmental risk, the researchers identified 93 constituting a medium risk, and 30 a high risk.

Other high-risk species include the raccoon, the African sacred ibis, the Asian hornet and the Pine processionary moth.

Raccoons are high on the list because they are widely featured in zoos and private collections, and in other countries, particularly in Germany, have been shown to be adept at breaking out. As a result it is thought to be only a matter of time before they bust out into the wild in the UK, to prey on birds' eggs and amphibians, and to spread raccoon roundworm, which is dangerous to birds and mammals.

The Asian hornet has made it to France and is thought likely to fly to the UK – or enter in a holidaymaker's luggage – in the near future. Its danger stems from its diet of honey bees and other pollinators, at a time when these insects are already suffering from habitat loss and pesticides.

Although climate change is making it easier for some species to settle in the UK, in most cases the species will invade in ballast, timber and vehicles, aided by the rise in trade and travel, Dr Roy said.



# This is a racoon – isn't it?



**Graham Field** @gramfield · Aug 27

@BBCSpringwatch @guardian This is a Racoon in my garden isn't it [pic.twitter.com/v4ZIM9RVVg](https://pic.twitter.com/v4ZIM9RVVg)

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# Raccoons go wild



**BBC Springwatch** @BBCSpringwatch · Aug 28

@gramfield @guardian It certainly looks like and it's not the first sighting we have had reported to us.

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BBC Springwatch retweeted



**Graham Field** @gramfield · Aug 27

@BBCSpringwatch @guardian This is a Raccoon in my garden isn't it [pic.twitter.com/v4ZIM9RvVg](http://pic.twitter.com/v4ZIM9RvVg)

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**Tim Blackburn** @TimBlackburn66 · Sep 1

@gramfield @BBCSpringwatch @guardian [onlinelibrary.wiley.com/doi/10.1111/gc...](http://onlinelibrary.wiley.com/doi/10.1111/gc...)

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**WildlifeKate** @katemacrae · Aug 31

@gramfield @BBCSpringwatch @guardian @williemackenzie Has it escaped from a wildlife park????!!

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**Chris Harris** @headfirstonly · Aug 29

@gramfield @BBCSpringwatch @guardian there's BBC report of raccoons in the area from 2010: [news.bbc.co.uk/local/wear/hi/...](http://news.bbc.co.uk/local/wear/hi/...)

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**On the right track** @\_G12 · Aug 28

Cute - Haven't seen any myself! This article from a few years back confirms sightings in the North East @gramfield [telegraph.co.uk/earth/wildlife...](http://telegraph.co.uk/earth/wildlife...)

The Telegraph

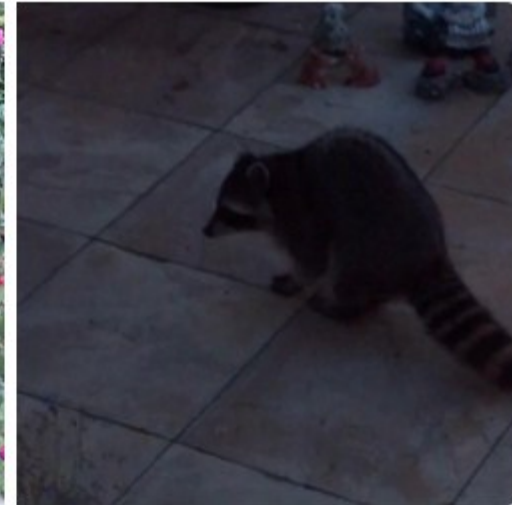
## Raccoon: Bushy-tailed bandits ready to go native - Telegraph

Raccoons may look like cute, furry foragers, but their presence in Britain is a cause for concern, says Eifion Rees

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## Convention on Biological Diversity

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GENERAL

UNEP/CBD/SBSTTA/18/9/Add.1  
1 May 2014

ORIGINAL: ENGLISH

SUBSIDIARY BODY ON SCIENTIFIC,  
TECHNICAL AND TECHNOLOGICAL ADVICE  
Eighteenth meeting  
Montreal, 23-28 June 2014  
Item 5.2 of the provisional agenda\*

### **PATHWAYS OF INTRODUCTION OF INVASIVE SPECIES, THEIR PRIORITIZATION AND MANAGEMENT**

*Note by the Executive Secretary*

#### **I. INTRODUCTION**

1. The Guiding Principles for the Prevention, Introduction and Mitigation of Impacts of Alien Species that threaten Ecosystems, Habitats and Species (the Guiding Principles) annexed to decision VI/23\*\* provide all Governments and organizations with guidance for developing effective strategies to minimize the spread and impact of invasive alien species. In particular, the Guiding Principles highlight the importance of identifying pathways of introduction of invasive species in order to minimize such introductions, and call to assess the risks associated with such pathways.

# Summary



**Citizen scientists play a critical role in our understanding of biological invasion**



# Thank you



UK  
Ladybird Survey



Department  
for Environment  
Food & Rural Affairs



COST is supported by the EU  
RTD Framework Programme



ESF provides the COST Office  
through an EC contract

