Engaging people in biodiversity monitoring (specifically invasive non-native species)

Helen Roy
(and about 19 000 others)
Defining citizen science...

<table>
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<th>Current descriptions of models of citizen science</th>
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<td>From Bonney <em>et al.</em> (2009a)</td>
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<td>'Crowdsourcing' to 'Participatory science'</td>
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<td>'Extreme citizen science'</td>
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Key: 🌿 Volunteer participants (any) 🌿 Volunteer participants (expert only) 🧑‍💼 Professionals

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[Logos of Centre for Ecology & Hydrology and NERC]
The landscape of citizen science

No clustering; there are no discrete ‘types’ of projects
Wonderful life of citizen science

- Biodiversity indicators → Legislative monitoring → 'Elaborate'
- 'Scientific sampling' → 'Elemental'
- Hypothesis-led science
- 'Mass participation'

Department for Environment Food & Rural Affairs

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Evolution MegaLab
Conker Tree Science

BRC Biological Records Centre

PlantTracker
Tool kits for citizen science...

How to choose citizen science approaches

How to run citizen science well

Evaluating cost-benefits of citizen science
Tree of national recording schemes

- Atlas published
- Repeat atlas
Celebrating centuries of recording wildlife
Every record counts - download a FREE app: https://www.ceh.ac.uk/citizen-science-apps
Celebrating one year of recording wildlife
Average relative change in distribution of **389 species of wild bee and hoverfly** using 1km occurrence records.
Informing conservation…
Non-native species surveillance
New discoveries on your doorstep…

*Scymnus interruptus*

First county record for Oxfordshire
(May 2013)
The joy of wildlife recording

- Big data
- Engaging
- Inspiring
- Fun and creative
- Captivating
- Collaborative
...a ladybird perspective
Sharing excitement
@UKLadybirds

St Marys CIW School @StMarysCIW · Jun 20
Repeating to @UKLadybirds @Natures_Voice @GwentWildlife
What do ladybirds drink?

St Marys CIW School @StMarysCIW · Jun 20
Repeating to @UKLadybirds
What are ladybirds favourite things to eat?

St Marys CIW School @StMarysCIW · Jun 20
Yr2 researching Ladybirds ready to write a report & find them outside
@UKLadybirds @Natures_Voice @GwentWildlife
...everywhere
From: John Powell
Sent: 26 October 2016 13:14
To: ladybird-survey
Subject: Sighting

St. Annes on Sea, FY8. 1 adult in my garden on 29 June 2014. Sitting on the leaf of a potted plant as shown on the picture attached. Kindest regards, John
Atlas, field guides and resources

Ladybirds

Helen E. Roy, Peter M.J. Brown, Richard F. Comont, Semy L. Polard and John J. Logggett

Ladybird species in the UK

There have been 3500 species of coccinellid described worldwide but until recently only 43 were considered as resident in Britain.

The herbivorous Bryony ladybird, Epilachna argus, and the small inconspicuous brown ladybird, Rhynchocoris chrysocephalus, are recent additions but neither have attracted as much attention as the Harlequin ladybird, Harmonia axyridis, first encountered in 2004.

Of the 46 ladybird species now found in Britain only 26 are readily recognisable as ladybirds and these are the focus of the Ladybird Survey.

A ladybird identification sheet (165kb) and a ladybird larva identification sheet (200kb) are available as PDF files.

Thanks to Jeroen Mertens for supplying many excellent photos.
From ladybird atlas to field guide

Ladybirds
(Coccinellidae)
of Britain and Ireland

Field Guide to the
Ladybirds
of Britain and Europe

Helen Roy
Peter Brown
Robert Frost
Remy Poland

Helen Roy and Peter Brown
Illustrated by Richard Lewington

BLOOMSBURY
More than 200 000 records; 19000 recorders
Surveillance and monitoring invasions

*Harmonia axyridis*
Species in decline (1995-2015)

-0.6
-0.5
-0.4
-0.3
-0.2
-0.1
0

Scymnus femoralis
Stethorus punctillum
Adalia bipunctata
Coccinella septempunctata
Coccinella undecimpunctata
Anatis ocellata
Psyllobora vigintiduopunctata
Coccidula rufa
Nephus redtenbacheri
Scymnus haemorrhoidalis
Scymnus auritus
Aphidecta obliterata
Anisosticta novemdecimpunctata
Coccidula scutellata
Coccinella hieroglyphica

UK Research and Innovation

NERC SCIENCE OF THE ENVIRONMENT

Centre for Ecology & Hydrology
NATURAL ENVIRONMENT RESEARCH COUNCIL
Species on the increase

- **Halyzia sedecimguttata**: 113 records, first record 1996, Central / Eastern Europe
- **Rhyzobius chrysomeloides**: 34 records, first record 1999, Australian species
- **Rhyzobius lophanthae**: 113 records, first record 1996, Central / Eastern Europe
- **Harmonia axyridis**

**UK Research and Innovation**
Going global…

Long-term changes in communities of native coccinellids: population fluctuations and the effect of competition from an invasive non-native species

Alois Honek, Zdenka Martinkova, Anthony F.G. Dixon, Helen E. Roy and Stanislav Pekar

Department of Biodiversity Research, Global Change Research Centre AS CR, Brno, Czech Republic and NERC Centre for Ecology & Hydrology, Wallingford, UK and "Department of Botany and Zoology, Faculty of Sciences, Masaryk University, Brno, Czech Republic

Diversity and Distributions. (Diversity Distrb.) (2016) 22, 982–994

Rapid spread of Harmonia axyridis in Chile and its effects on local coccinellid biodiversity

Audrey A. Grez, Tania Zaviezo, Helen E. Roy, Peter M.J. Brown and Gustavo Bizama

Citizen scientists have the potential to play a crucial role in the study of rapidly changing lady beetle (Coccinellidae) populations. We used data derived from three coccinellid-focused citizen science programs to examine the costs and benefits of data collection from direct citizen science data used without verification and verified citizen science (observations verified by trained experts) programs. Data collated through direct citizen science overestimated species richness and diversity values in comparison to verified data, thereby influencing interpretation. The use of citizen scientists to collect data also influenced research costs; our analysis shows that verified citizen science was more cost effective than traditional science (in terms of data gathered per dollar). The ability to collect a greater number of samples through direct citizen science may compensate for reduced accuracy, depending on the type of data collected and the tepet and extent of errors committed by volunteers.

Lessons from lady beetles: accuracy of monitoring data from US and UK citizen-science programs

Mary M. Gardiner*, Leslie E. Allic*, Peter MJ Brown*, John E. Lasley*, Helen E. Roy*, and Rebecca Rice Smith*

The harlequin ladybird, Harmonia axyridis: global perspectives on invasion history and ecology


Insect Conservation and Diversity

Insect Conservation and Diversity (2016) 9, 203–209
doi: 10.1111/ecd.12158

The harlequin ladybird, Harmonia axyridis: global perspectives on invasion history and ecology

Received: 11 July 2015 / Accepted: 3 November 2015
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SHORT COMMUNICATION

In the shadow of the condor: invasive *Harmonia axyridis* found at very high altitude in the Chilean Andes

AUDREY A. GREZ,¹ TANIA ZAVIEZO,² HELEN E. ROY,³ PETER M. J. BROWN⁴ and BERNARDO SEGURA⁴ ¹Facultad de Ciencias Veterinarias y Pecuarias, Universidad de Chile, Santiago, Chile, ²Facultad de Agronomía e Ingeniería Forestal, Pontificia Universidad Católica de Chile, Santiago, Chile, ³Centre for Ecology & Hydrology, Wallingford, UK and ⁴Animal & Environment Research Group, Anglia Ruskin University, Cambridge, UK
For many countries, the efficiency of invasion monitoring can be improved by inclusion into pre-existing biodiversity monitoring schemes. **Countries may capitalize on citizen science, as well as emerging online and remote technologies in data capture to improve records of invasions.** For all countries the goal should be to provide at regular intervals (at least every five years) alien species occurrence data corresponding to their maximum level of resolution, be it for the national inventory, priority sites, spatial extent, or the national distribution of occurrence of a priority set of taxa.
Citizen science – excellent science and engagement
From ladybirds to hornets

Vespa velutina
Terrestrial predator
Native to China
Arrived in pottery consignment
Bordeaux, France in 2004
Asian Hornet Watch

Learn more about Asian hornet and help detect it by recording suspected sightings.

- Species Info
- Record
- App Info

Asian hornet is often confused with similar species, find out more about each below.

Asian hornet

European hornet

Giant Woodwasp / Greater Horntail

Asian hornet

Vespa velutina

Flight period

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Size: Queen: up to 30mm long; Worker: up to 25mm long
Legs: yellow at ends contrasting with dark upper parts
Abdomen: dark brown / black with a yellow/orange band on 4th segment
Head: dark from above, orange from the front
Antenna: dark coloured
Citizen science for monitoring invasions

Number of reports

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec


STIRRED BY HORNETS

The long, hot summer of 2018 has been fabulous for wasps of all species - especially for dedicated hornet watchers.

Alien arrival: Asian hornet

The Asian, or yellow-legged, hornet is native to South-east Asia, and was first seen in Europe in south-west France in 2004, probably having been introduced as a stinger in pottery imported from China. It has since spread across France, and there
Asian hornet – arrived September 2016

Eradiated in 2016 and 2017
New records Autumn 2018
…charismatic species…
...amazing recorders...
...unravelling ecology together...
Summary

• Many, many reasons for engaging people with biodiversity
  – Need for big data to address big ecological questions
  – Need to engage people in decision-making
  – ...etc

• But words cannot describe the joy of celebrating biodiversity together
Thank you