

Responses of Phytophagous Insects to a Changing Flora

Helen E. Roy

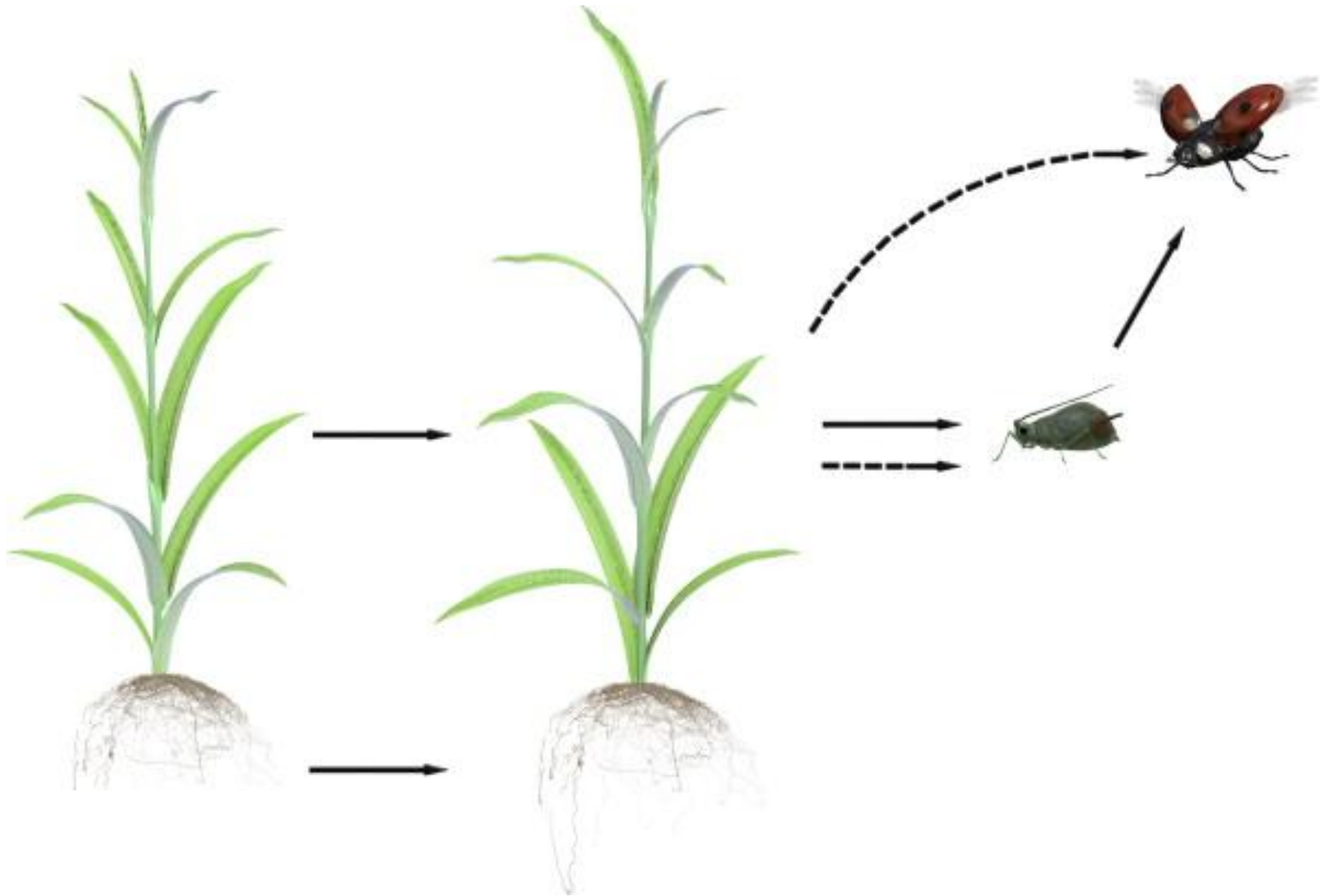
Tristan Bantock, Marc Botham, Nicholas Clough,
Colin Harrower, Chris D. Preston, David B. Roy &
Alan Stewart



Pandora neoaphidis and *Coccinella septempunctata*



Plants calling in body guards

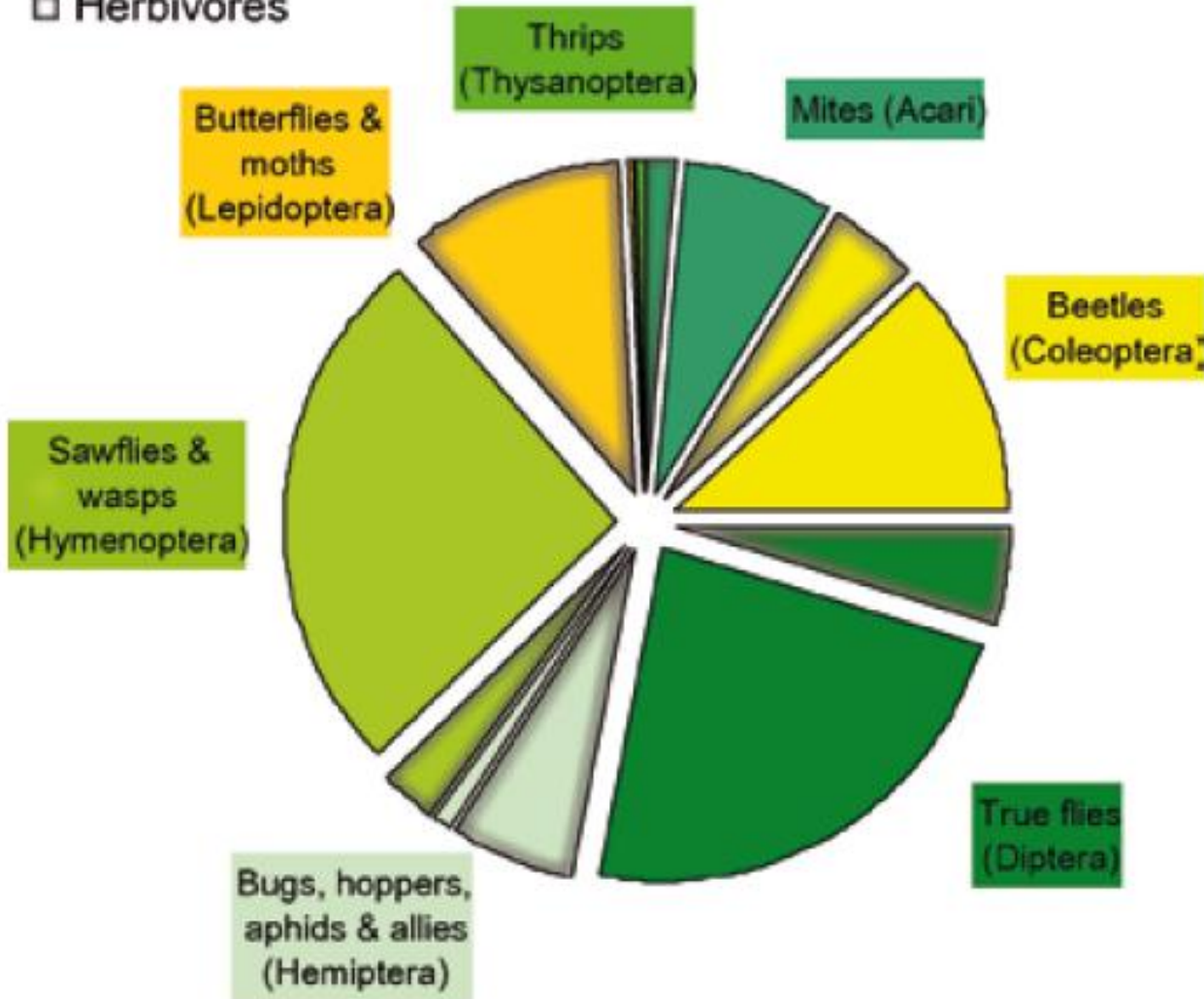


Diversity of phytophagous insects



8000 herbivores in Britain

□ Herbivores



**Revealing the
foundations of
biodiversity:
The Database of
British Insects
and their
Foodplants**

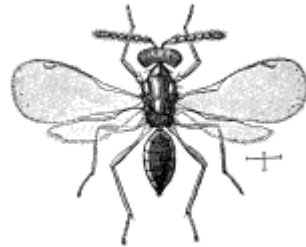


Aphids. Bob Gibbons

Richard M Smith and David B Roy

Smith and Roy (2008) *British Wildlife* 20: 17-25

Ecological networks

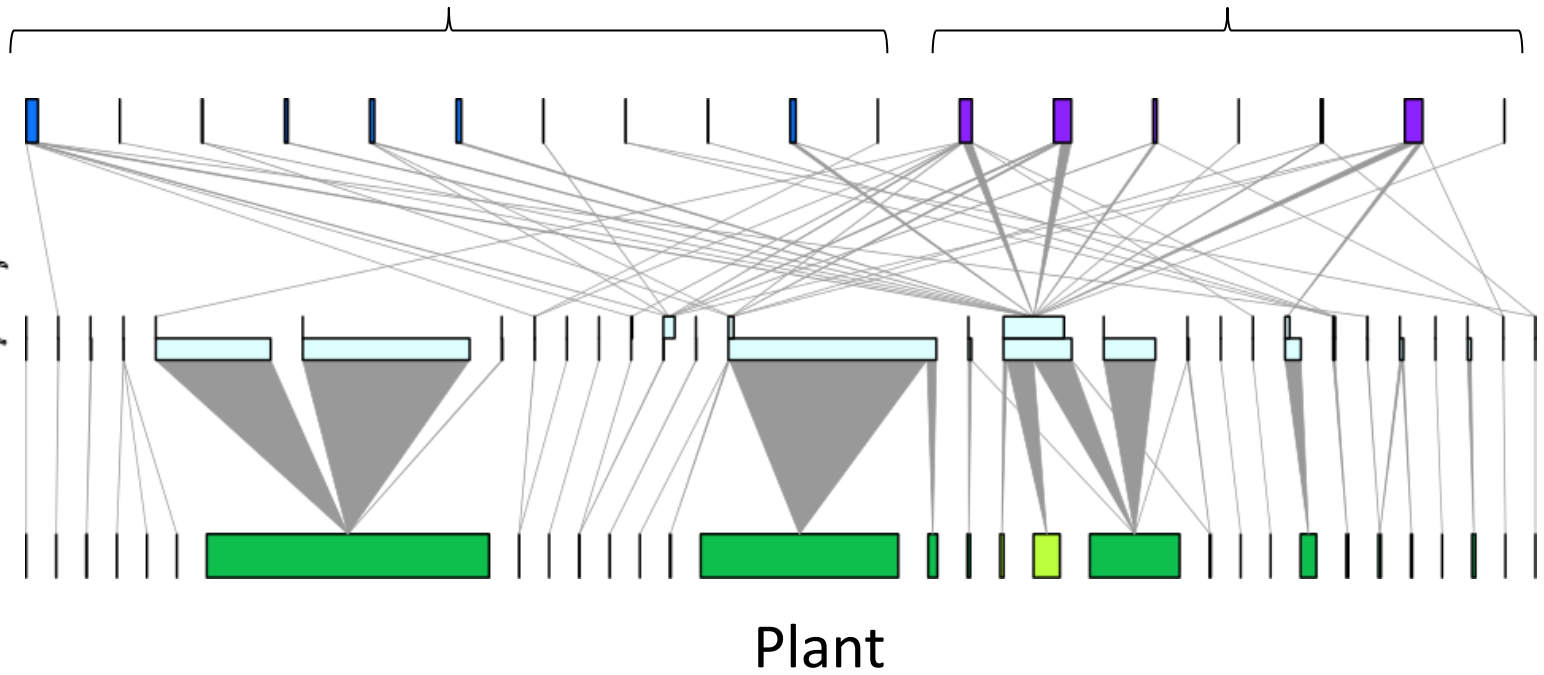


Primary aphid parasitoid

Secondary aphid parasitoid



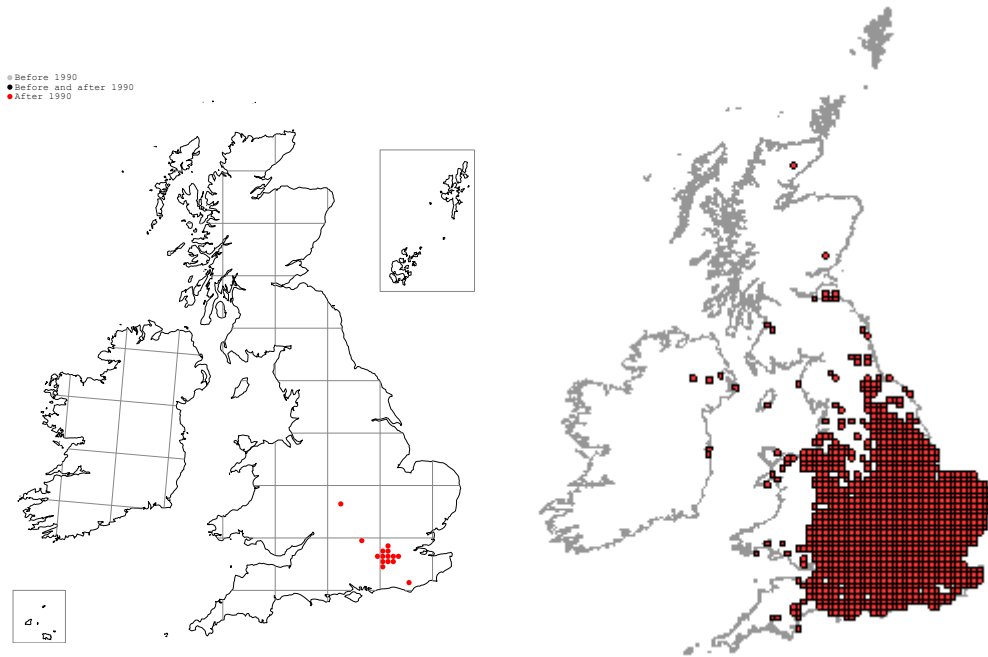
Aphid



Plant

Pocock, M.J.O., Evans, D.M. & Memmott, J. (2012) The robustness and restoration of a network of ecological networks. *Science* **335**, 973-977.

Phytophagous insects are typically specialist

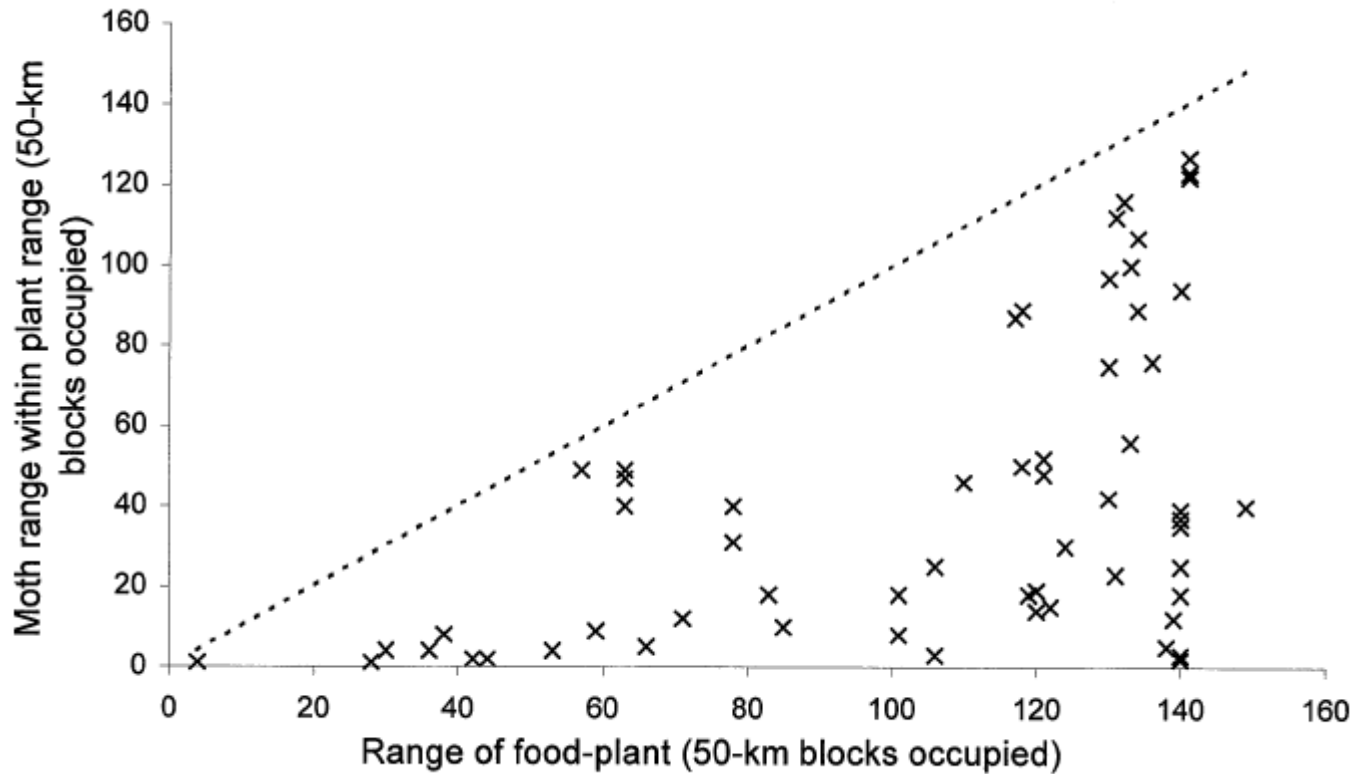


- Dietary specialists
 - Monophagous
 - Oligophagous
- Dietary generalists
 - Polyphagous



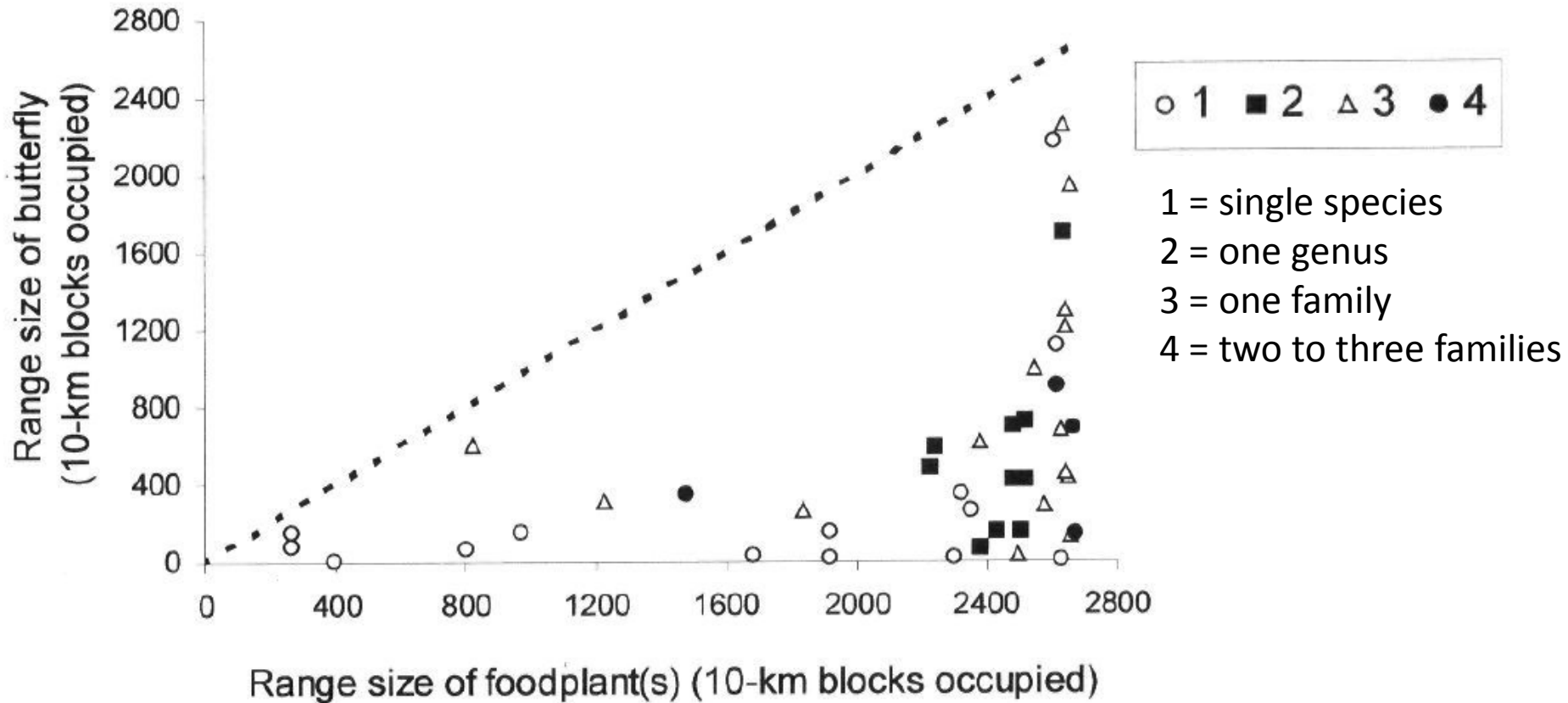
Bryony ladybird, *Henosepilachna argus*

Moths and their host plants



Range sizes of monophagous moth species in Britain and the range size of their host plants

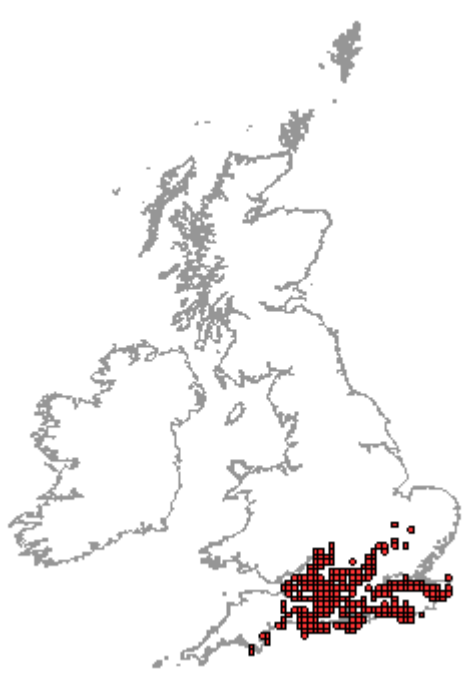
Butterflies and their host plants



Most insects in Britain are
constrained by climate



Adonis blue and *Hippocrepis comosa*









Alien (=non-native) species

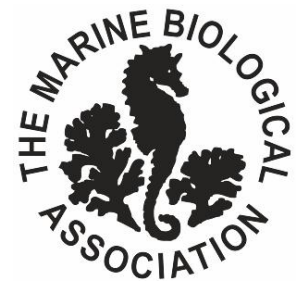
Non-Native Species in Great Britain: establishment, detection and reporting to inform effective decision making

Helen E. Roy, Jim Bacon, Björn Beckmann, Colin A. Harrower, Mark O. Hill, Nick J.B. Isaac, Chris D. Preston, Biren Rathod, Stephanie L. Rorke
Centre for Ecology & Hydrology, Wallingford, Oxfordshire, OX10 8BB

John H. Marchant, Andy Musgrove, David Noble
British Trust for Ornithology

Jack Sewell, Becky Seeley, Natalie Sweet, Leoni Adams, John Bishop
Marine Biological Association

Alison R. Jukes, Kevin J. Walker and David Pearman
Botanical Society of the British Isles



About 2000 established non-native species



GB Non-Native Species Information Portal

Broad group	Number of established non-native species
Higher plants	1377
Lower plants	25
Insects	278
Non-insect invertebrates	141
Vertebrates	50
Other	4
Total	1875



69 % plant arrivals through horticulture



Functional Groups of non-native species

	T	F	M	Total
No data	9	2	1	12
Detritivore	6	1	3	10
Alga			25	25
Land plant	1350	23		1376
Filter-feeder		4	35	44
Herbivore	217	14		240
Omnivore	56	5	2	66
Parasite	1	5	2	9
Predator	45	6	6	67



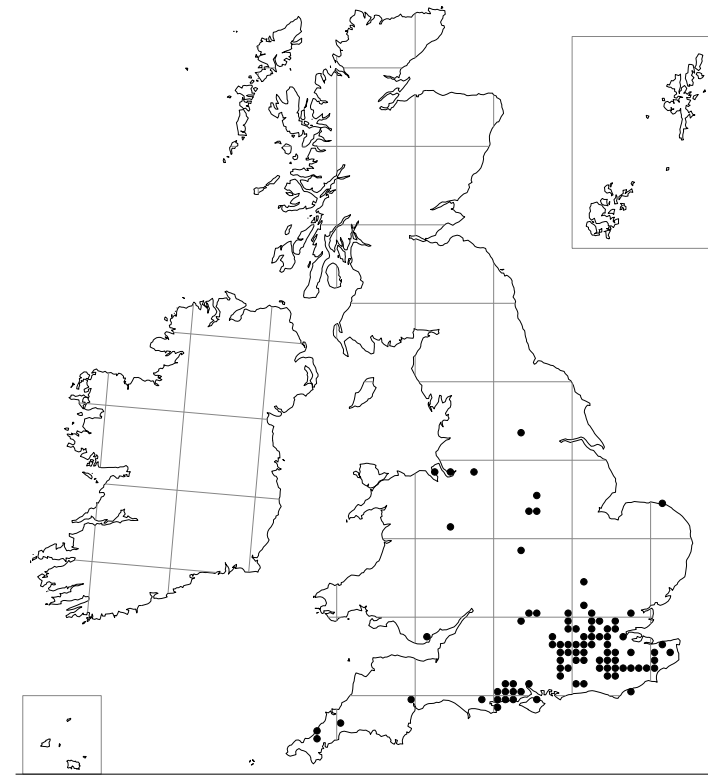
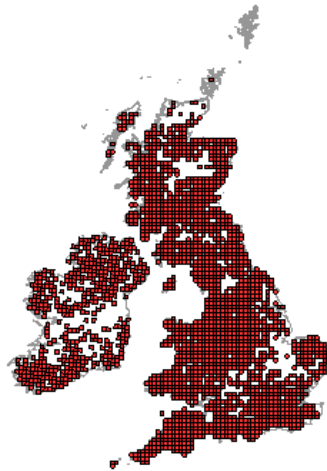
Enemy Release Hypothesis



Studies	Support for ERH	Number of host species
Biogeographical		
Comparative		
Beckstead & Parker (2003)	n.s.	One plant
Callaway <i>et al.</i> (2004)	+	One plant
DeWalt <i>et al.</i> (2004)	+	One plant
Fenner & Lee (2001)	+	One plant
Memmott <i>et al.</i> (2000)	+	One plant
Reinhart <i>et al.</i> (2003)	+	One plant
Torchin <i>et al.</i> (2001)	+	One aquatic invertebrate
Wolfe (2002)	+	One plant
Correlative		
Mitchell & Power (2003)	+	473 plants
*Poulin & Mouillot (2003)	+	Two fishes
†Torchin <i>et al.</i> (2002)	+/-	10 aquatic invertebrates
Torchin <i>et al.</i> (2003)	+	26 animals
Community		
Comparative		
Agrawal & Kotanen (2003)	-	15 congeneric pairs of plants
Bellingham (1998)	-	One pair of plants
Blaney & Kotanen (2001a)	n.s.	15 congeneric pairs of plants
Blaney & Kotanen (2001b)	n.s.	43 (21 NIS) plants
Blaney & Kotanen (2002)	n.s.	39 (20 NIS) plants
Goergen & Daehler (2001)	+	One pair of plants
Gross <i>et al.</i> (2001)	-	One pair of plants
Lesica & Miles (1999)	+	One pair of plants
Novotny <i>et al.</i> (2003)	n.s.	71 (two NIS) plants
Radho-Toly <i>et al.</i> (2001)	n.s.	Two congeneric pairs of plants
Schierenbeck <i>et al.</i> (1994)	+	One congeneric pair of plants
Siemann & Rogers (2003b)	+	One pair of plants
Correlative		
Clay (1995)	-	767 plants

Graphocephala fennahi

- Native to North America
- Introduced to GB in 1930s
- Spread throughout S. England
- New record from Leeds
- Record on-line



Prokelisia marginata

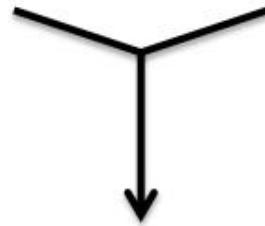
- Native to east coast of North America
- First record Hythe in 2008
- Monophagous on *Spartina* spp.
- Complex ecological communities



Alien herbivore on alien plant

Spartina alterniflora
(N.America)

S. maritima
(Europe)



S. townsendii (sterile hybrid)



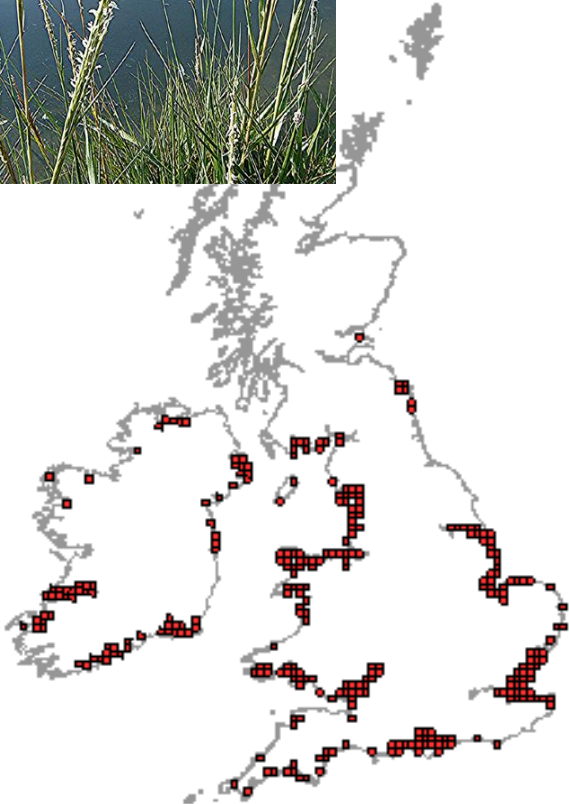
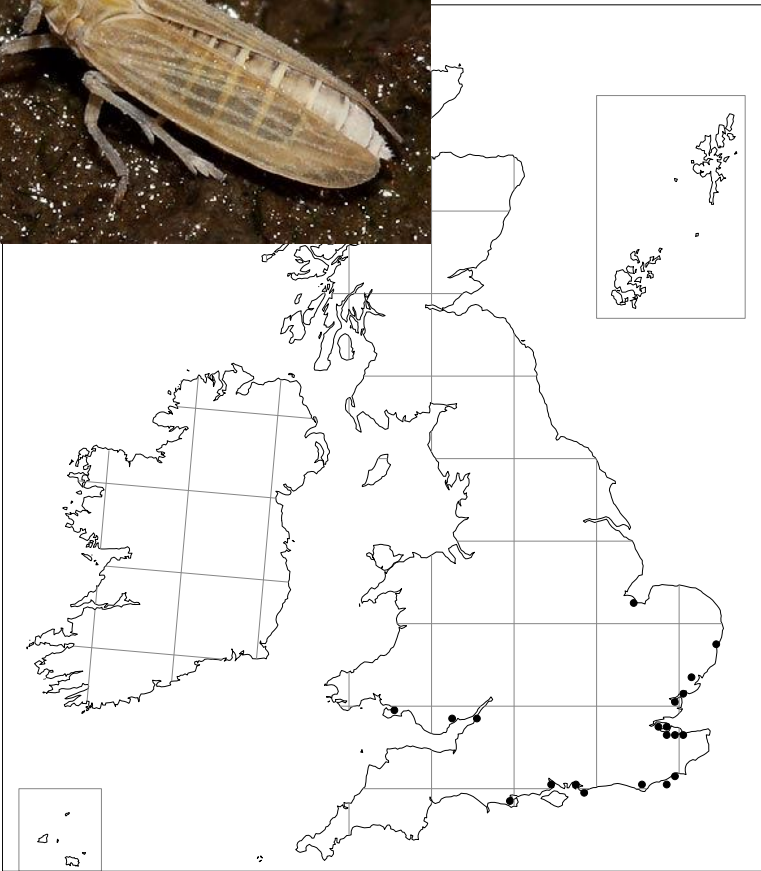
S. anglica (fertile allopolyploid)



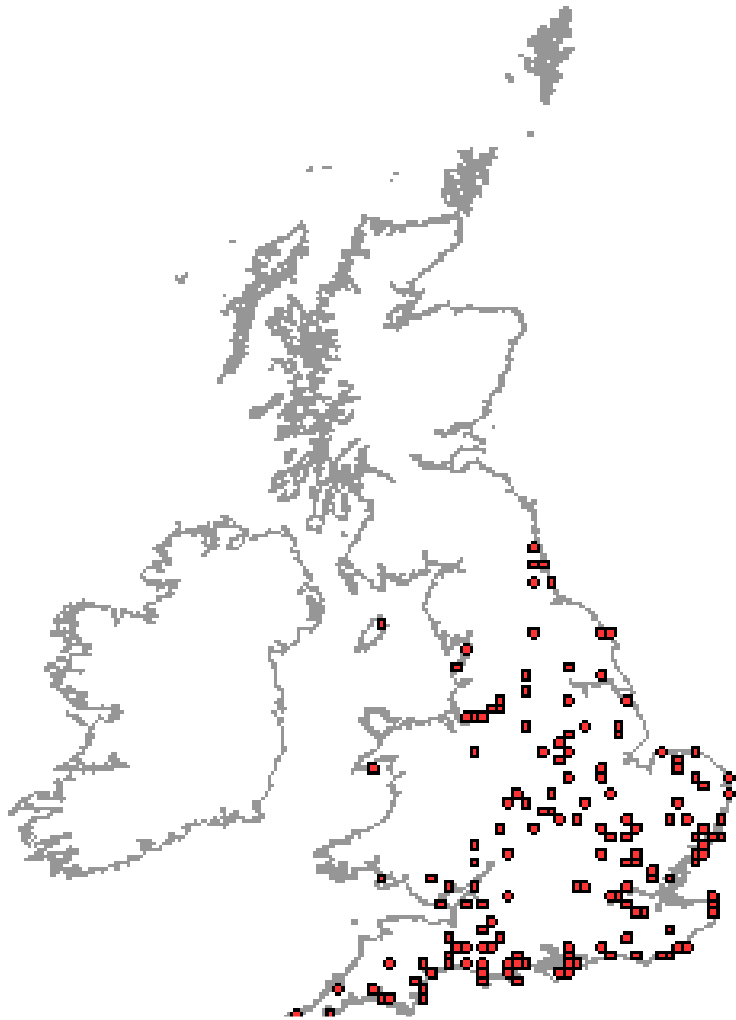
Spartina anglica



Prokelisia marginata on cordgrass, *Spartina anglica*



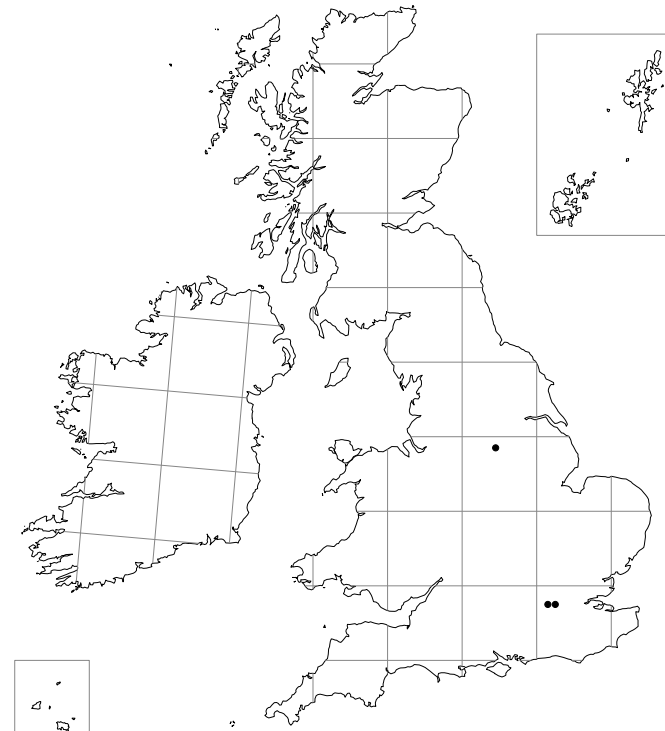
Conifer specialists



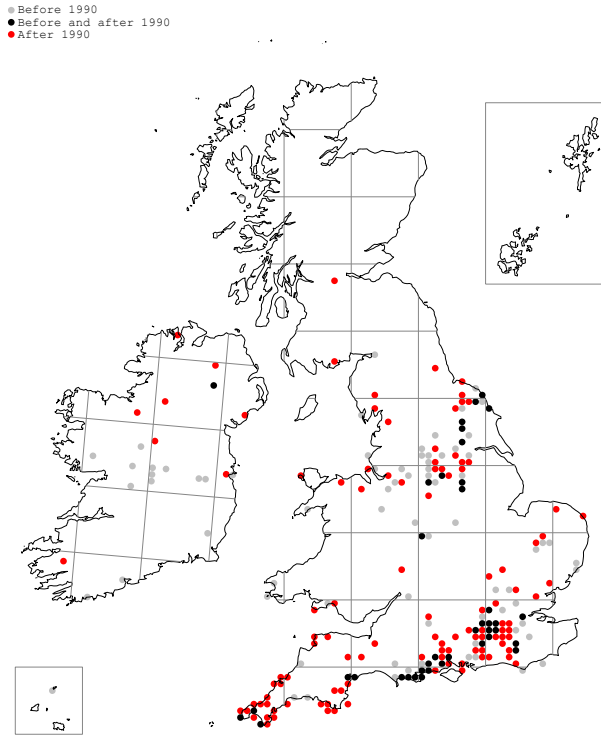
- Western conifer seed bug
Leptoglossus occidentalis
- Native to North America
- First record in Britain in 2008
- Record on-line

Eremocoris fenestratus

- Historically associated with juniper in the Chilterns
- Not seen since 1960s
- Rediscovered in 2010 in London
- Associated with cypress, a non-native foodplant
- Recent records refer to new colonists
- Probable horticultural introduction, perhaps via Kew Gardens



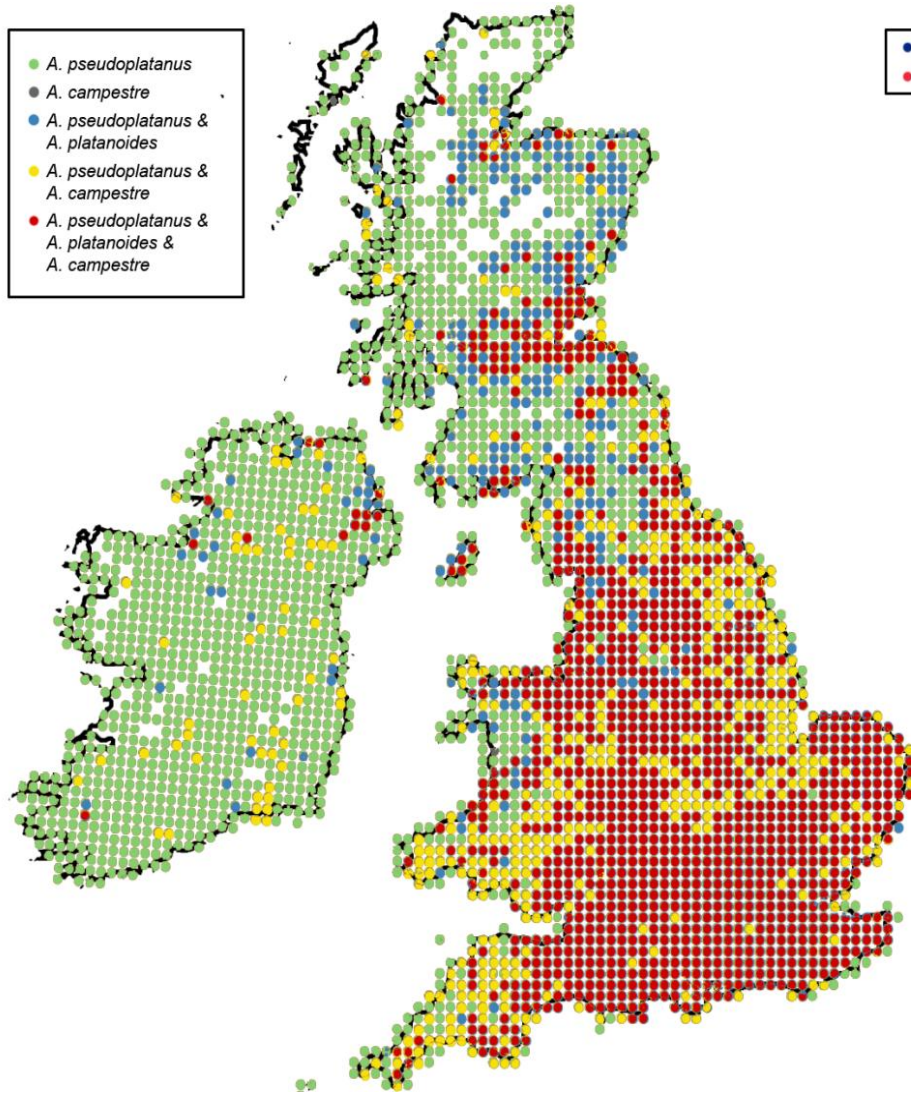
Chilocorus bipustulatus



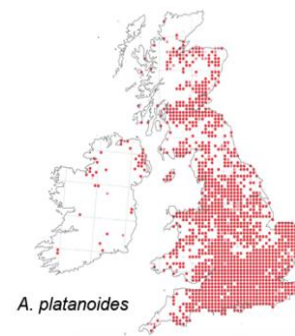
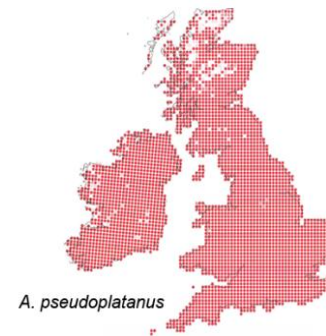
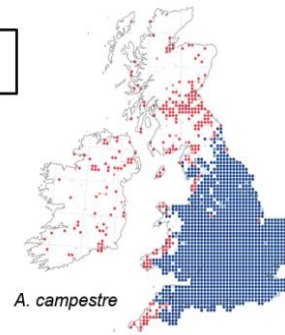
- Increasingly found on cypress
- Species complex?

Insect communities on *Acer* species

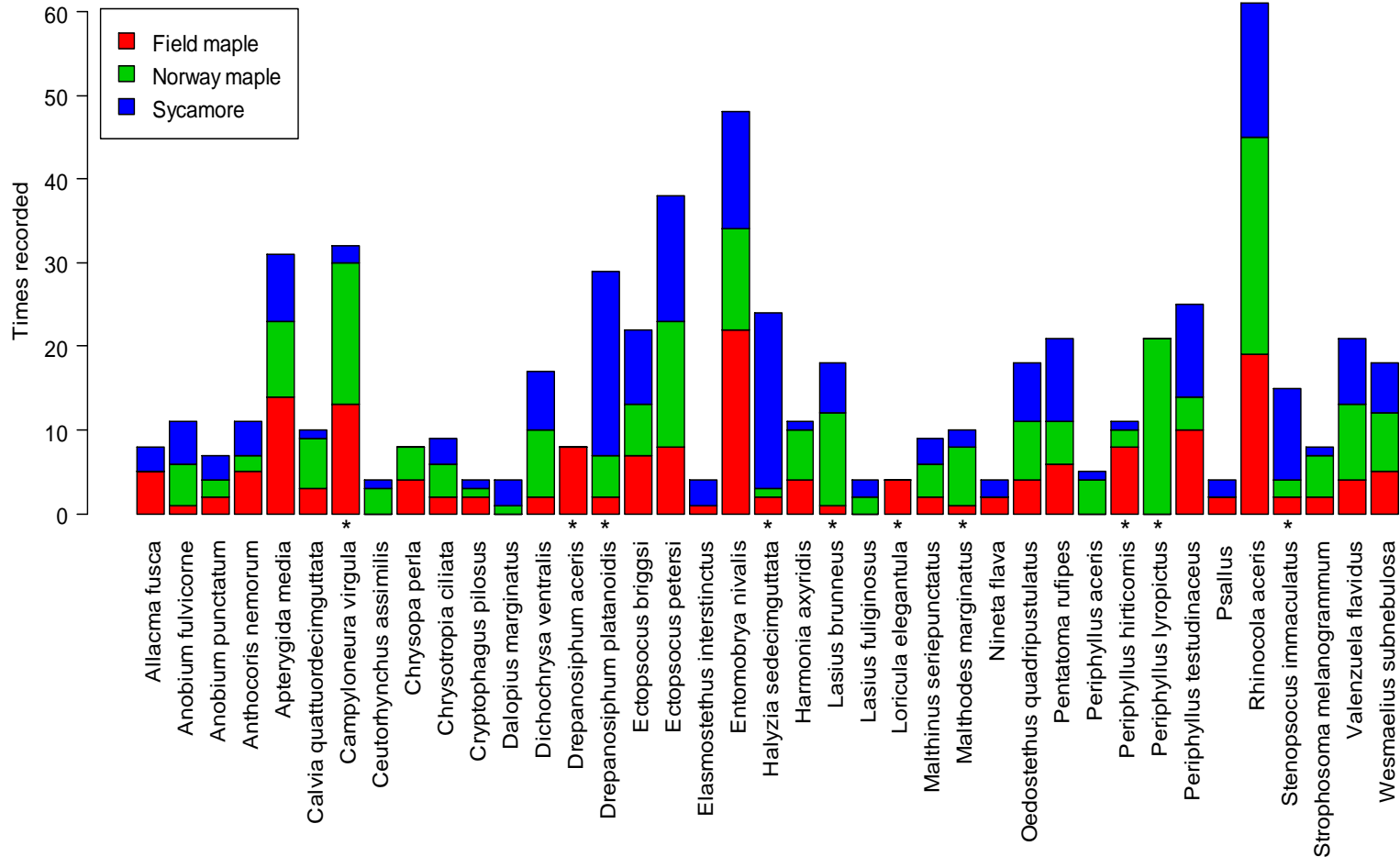
- *A. pseudoplatanus*
- *A. campestre*
- *A. pseudoplatanus* & *A. platanoides*
- *A. pseudoplatanus* & *A. campestre*
- *A. pseudoplatanus* & *A. platanoides* & *A. campestre*



- Native
- Alien



Similarity of insects on *Acer* species



Terrestrial Heteroptera Recording Scheme for Britain & Ireland



There are now three recording schemes for Heteroptera, two dealing with the terrestrial species and the third covering the water bugs. The first column of the [systematic list](#) indicates which of these schemes each species belongs to.

1. Terrestrial Heteroptera (Shieldbugs & allies)

- Includes around 60 species in the following families : Pentatomidae, Acanthosomatidae, Cydnidae, Scutelleridae, Thyreocoridae, Coreidae, Rhopalidae, Alydidae, Stenocephalidae and Pyrrhocoridae

Please send all records to Tristan Bantock at:

records@britishbugs.org.uk

2. Terrestrial Heteroptera (Plantbugs & allies)

- Includes around 400 species in the following families : Miridae, Lygaeidae, Aradidae, Anthocoridae, Berytidae, Nabidae, Reduviidae, Ceratocombidae, Cimicidae, Microphysidae, Piesmatidae and Tingidae

Please send all records to Jim Flanagan at:

jimflanagan@btinternet.com

3. Aquatic Heteroptera (Waterbugs & allies)

- Includes around 90 species in the following families : Aepophilidae, Aphelocheiridae, Corixidae, Dipsocoridae, Gerridae, Hydrometridae, Hebridae, Mesovelidae, Nepidae, Naucoridae, Notonectidae, Pleidae, Veliidae and Saldidae

- Please send all records to Tony Cook at:

tony.cook20@btinternet.com



Auchenorrhyncha Recording Scheme for Britain & Ireland
Leafhoppers, planthoppers, froghoppers, treehoppers & cicadas

The Auchenorrhyncha Recording Scheme now has a dedicated website at ledra.co.uk, which contains a wealth of information about this group of insects.

All records should be sent to Alan Stewart at:

a.j.a.stewart@sussex.ac.uk

A new recording scheme for Psyllids

As of 2012, a recording scheme has been set up for psyllids, which will be run by Joe Botting. All records should be sent to him at:

ukpsyllids@yahoo.co.uk



Welcome back Helen.


Recent sightings

The following list of records includes verified records and those awaiting verification of species groups you are interested in which have been recently added in your area.

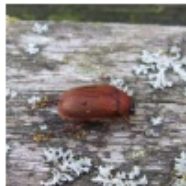
Species	Site name	Grid Ref	Date	Recorder
<i>Platycis minutus</i>	Brasenose Wood	SP563053	26/08/2012	Comont, Richard
<i>Harmonia axyridis</i> Harlequin Ladybird		SP5605	26/08/2012	Comont, Richard
<i>Coccinella septempunctata</i> Seven-Spot Ladybird		SP5605	26/08/2012	Comont, Richard
<i>Timarcha tenebricosa</i> Bloody-Nosed Beetle		SP5605	26/08/2012	Comont, Richard
<i>Harmonia axyridis</i> form <i>succinea</i>	Watlington Hill	SU705934	26/08/2012	Roy, David

[first](#) [prev](#) [1](#) [2](#) [3](#) [4](#) [5](#) [6](#) [next](#) [last](#) Showing records 1 to 5 of 116


Recently added photos



Serica brunnea | Brown Chafer

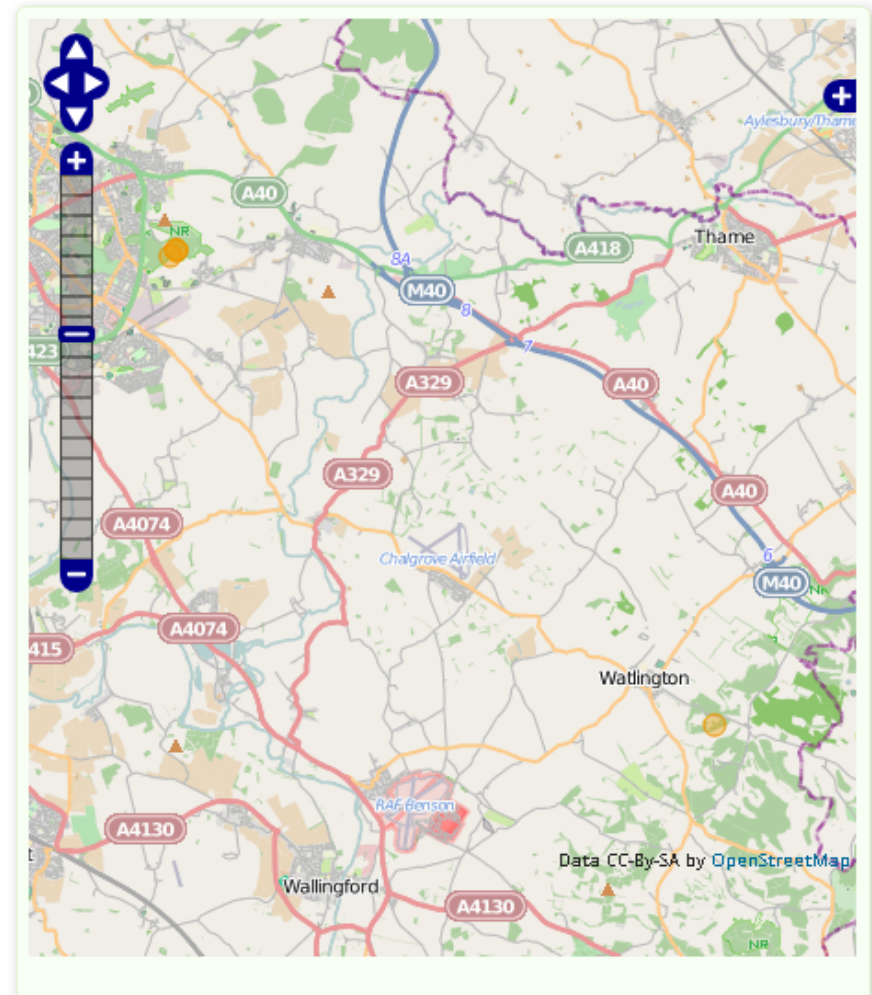


Serica brunnea | Brown Chafer



Phyllobius (*Metaphyllobius*) *pomaceus*

[first](#) [prev](#) [1](#) [2](#) [3](#) [next](#) [last](#) Showing records 1 to 3 of 8



Summary

- Most phytophagous insects are specialist
- Many insects in Britain are at northern range edge
 - Evidence of insects undergoing northward range expansion
- Some changes in phytophagous insect distribution reflect changing flora
 - Many alien insects are associated with alien plants
- Opportunities for recording insects and plants

Acknowledgements

The volunteer recording community

