

Using data from the Orthoptera Recording Scheme to study climate change



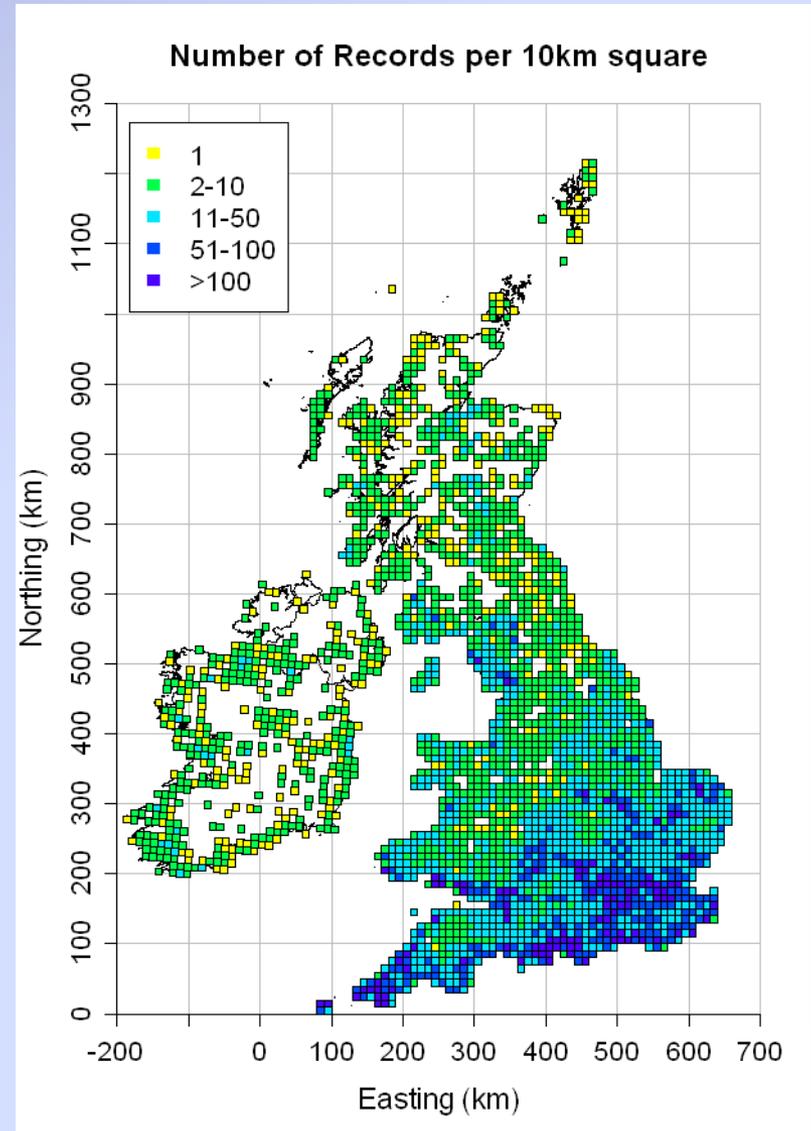
Mark Houghton

Björn Beckmann
Peter Sutton



Outline

- The Orthoptera & Allied Insects Recording Scheme
- Changing Orthoptera distributions
- Using Scheme data to study change

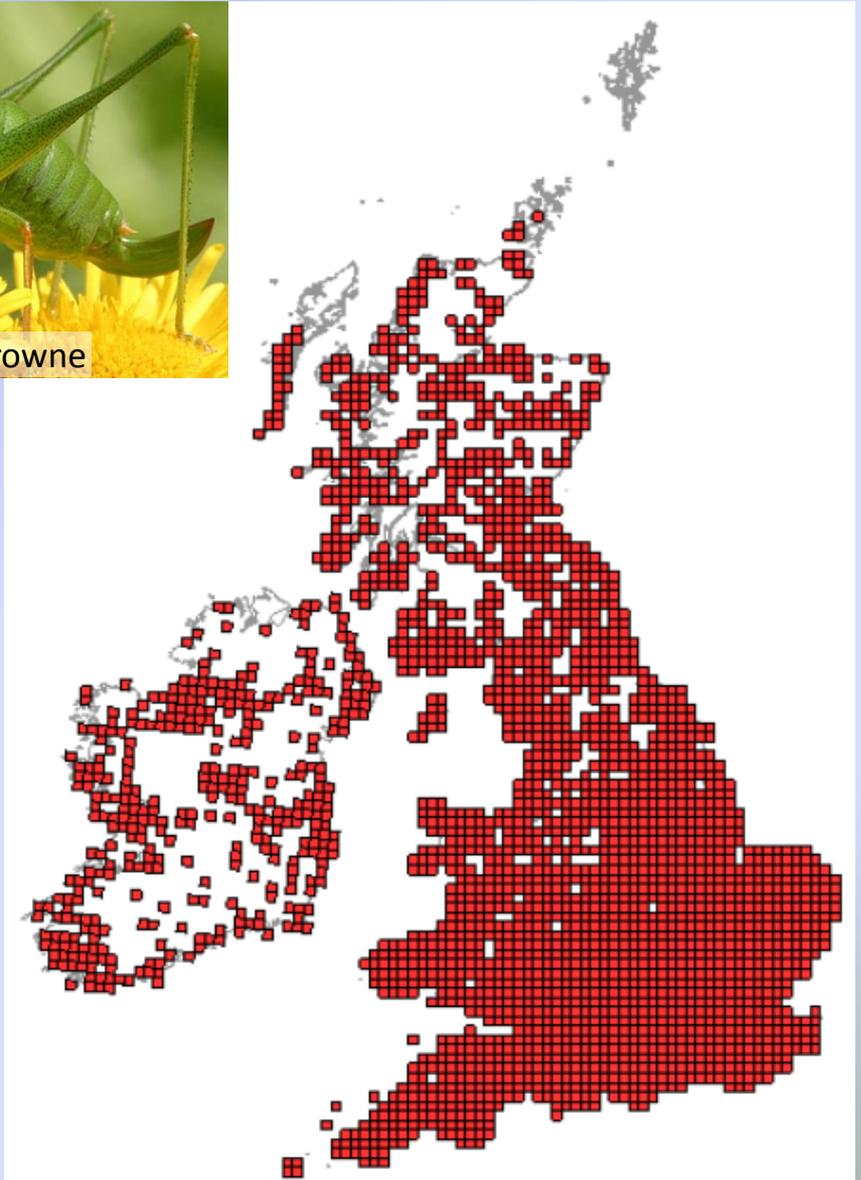


Orthoptera & Allied Insects Recording Scheme

- Orthoptera

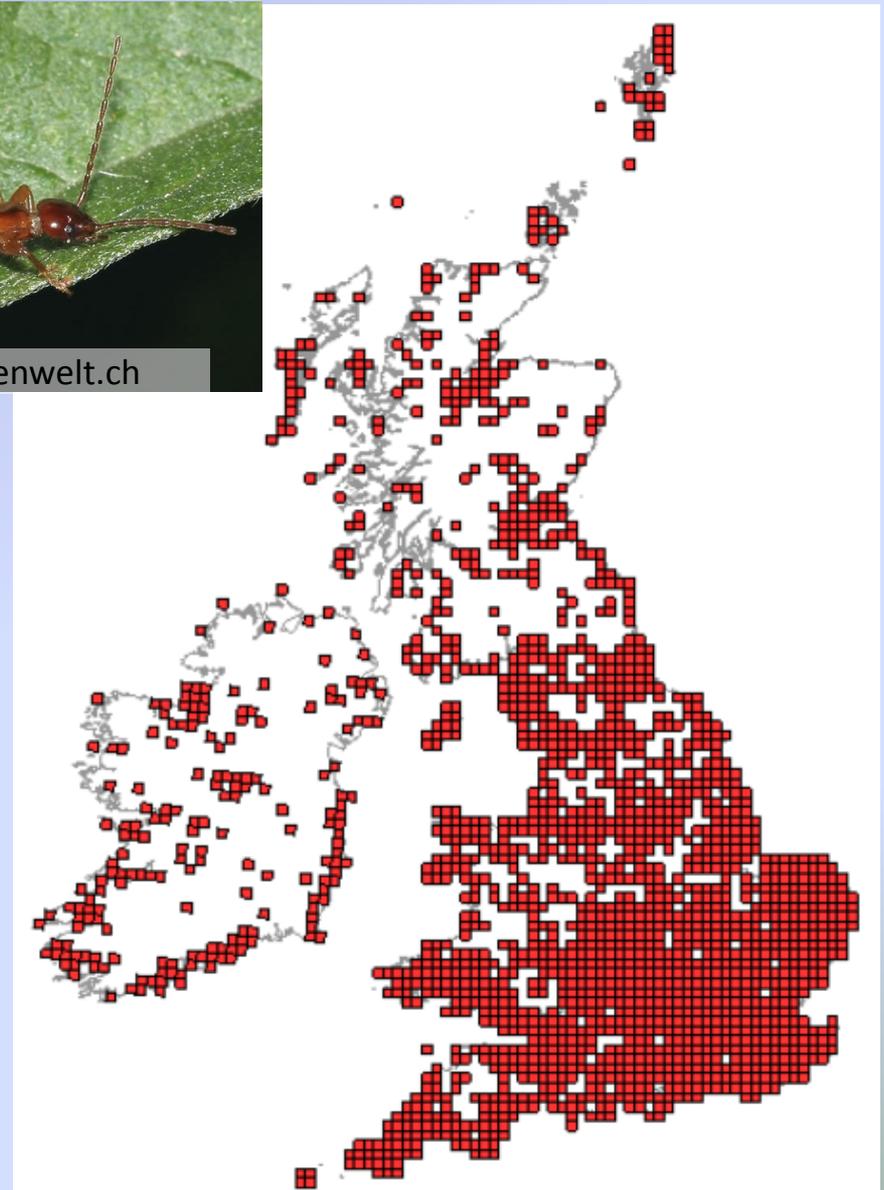


Photo: David Browne



Orthoptera & Allied Insects Recording Scheme

- Orthoptera
- Dermaptera

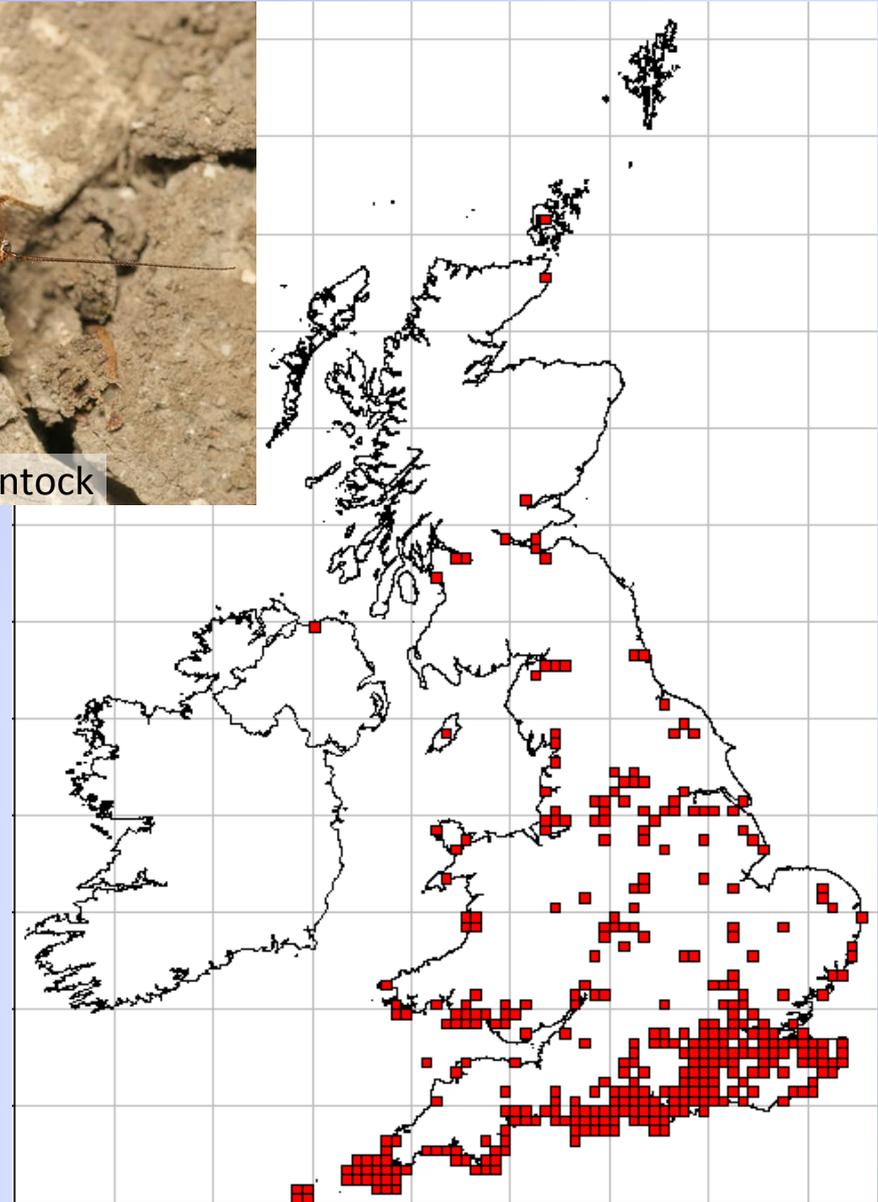


Orthoptera & Allied Insects Recording Scheme

- Orthoptera
- Dermaptera
- Dictyoptera

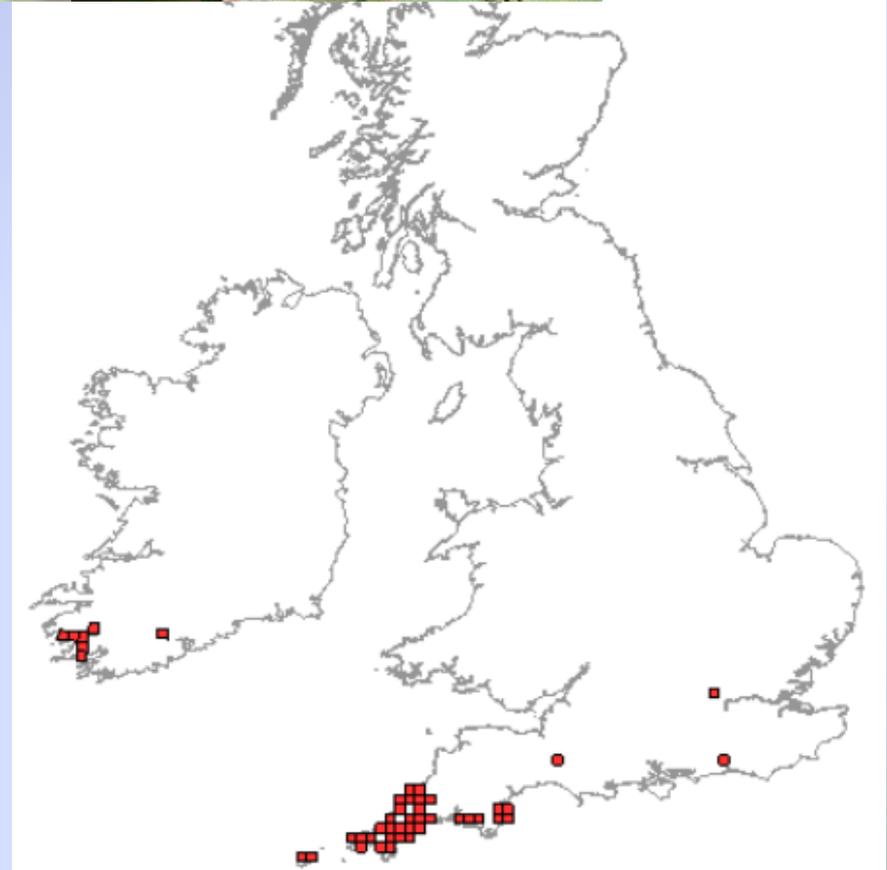


Photo: Tristan Bantock



Orthoptera & Allied Insects Recording Scheme

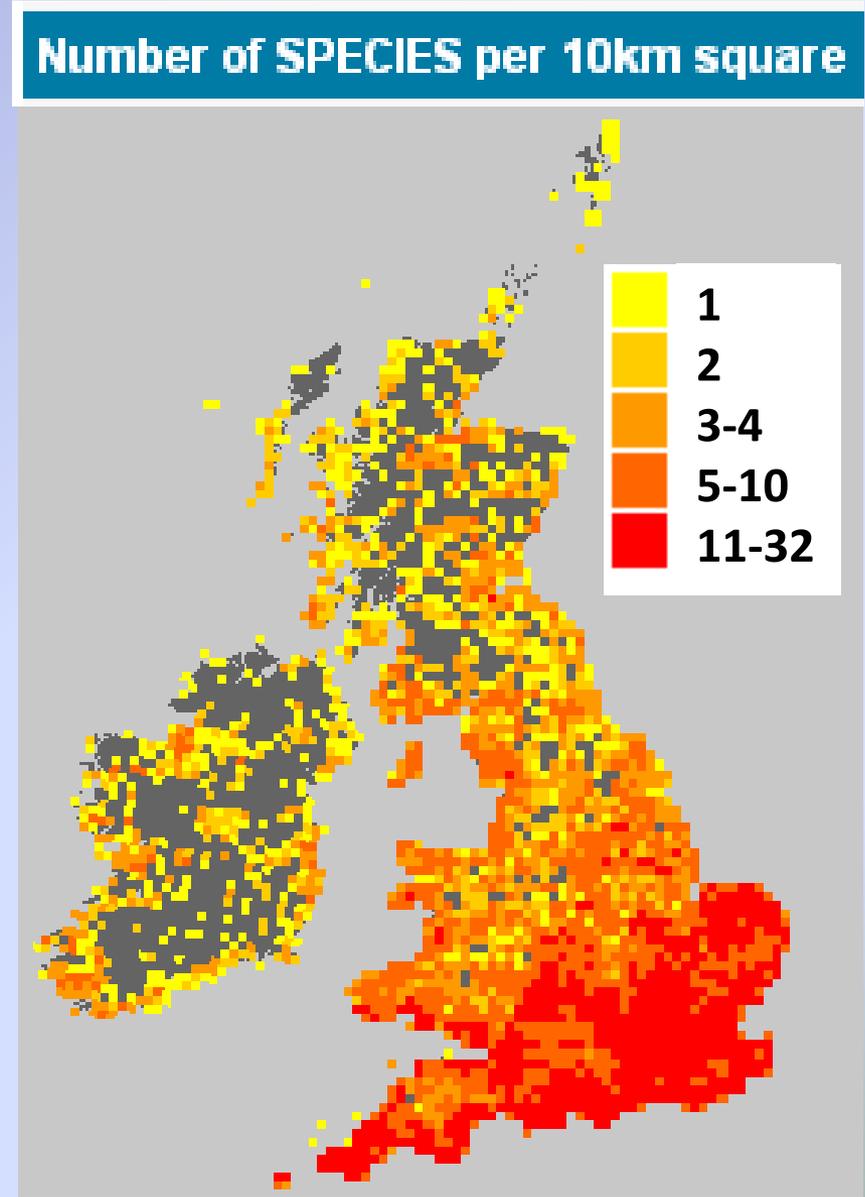
- Orthoptera
- Dermaptera
- Dictyoptera
- Phasmida

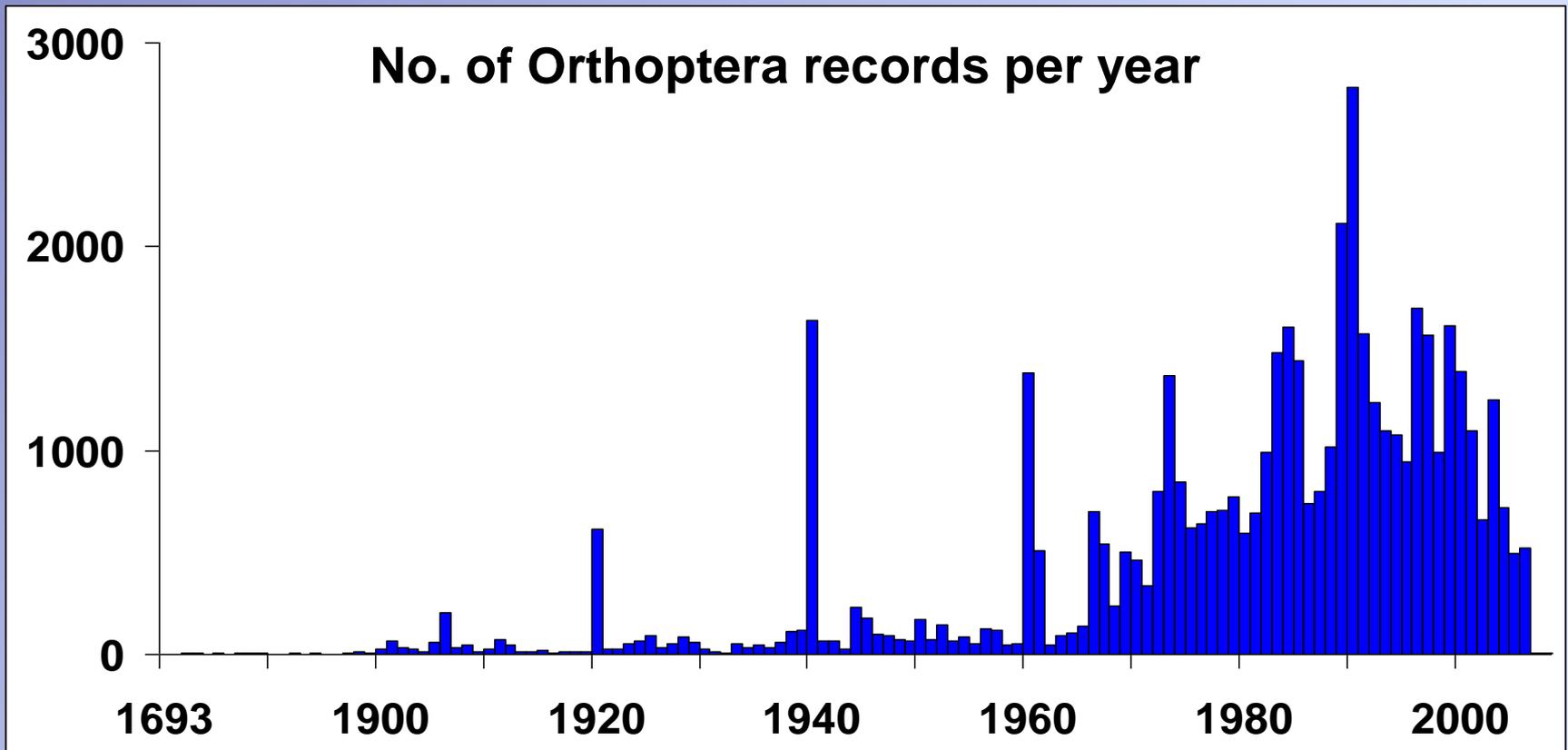


Orthoptera & Allied Insects Recording Scheme

- Orthoptera
- Dermaptera
- Dictyoptera
- Phasmida

- covers Britain & Ireland
- established 1968
- > 2,500 recorders
- > 60,000 records

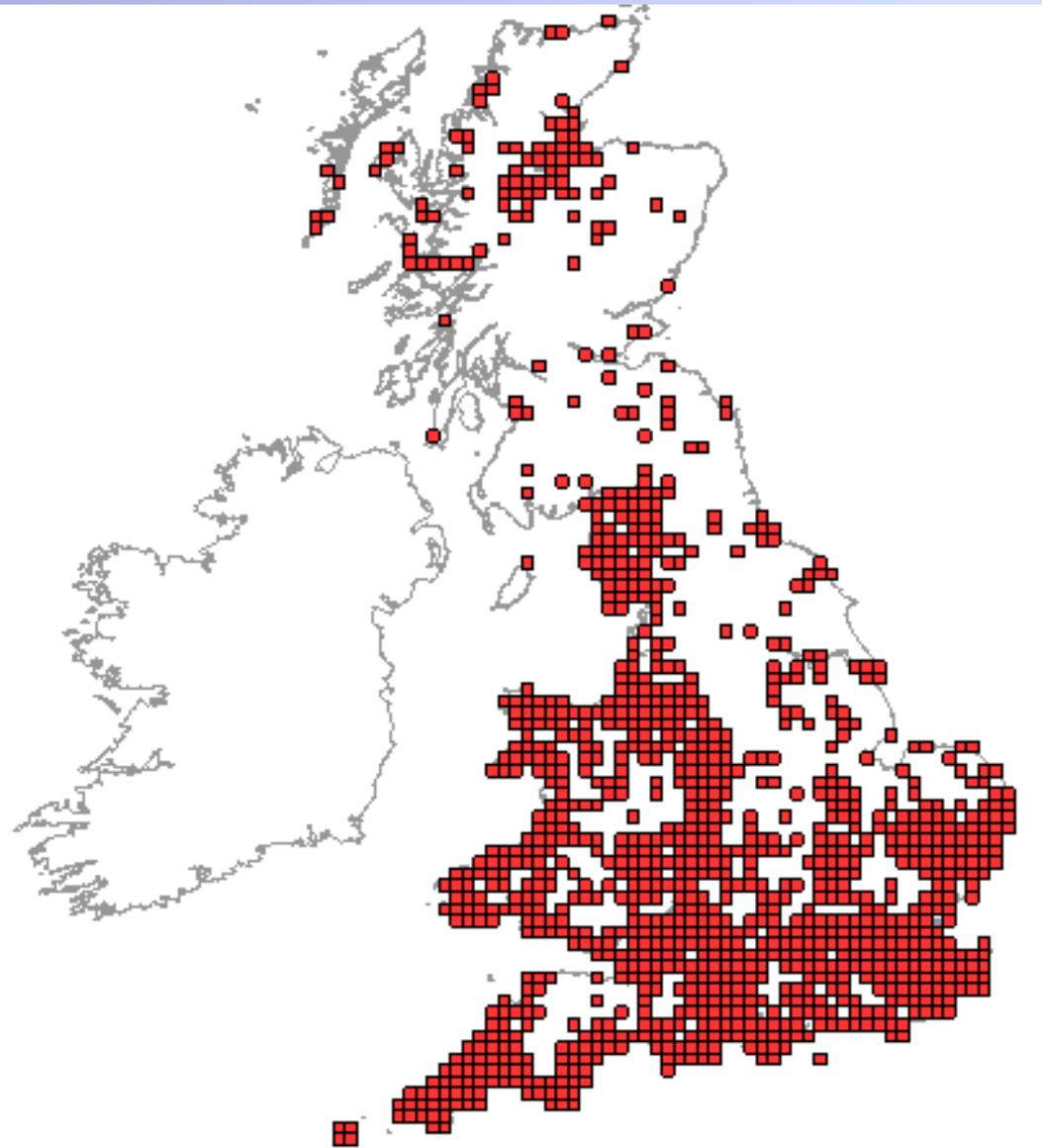




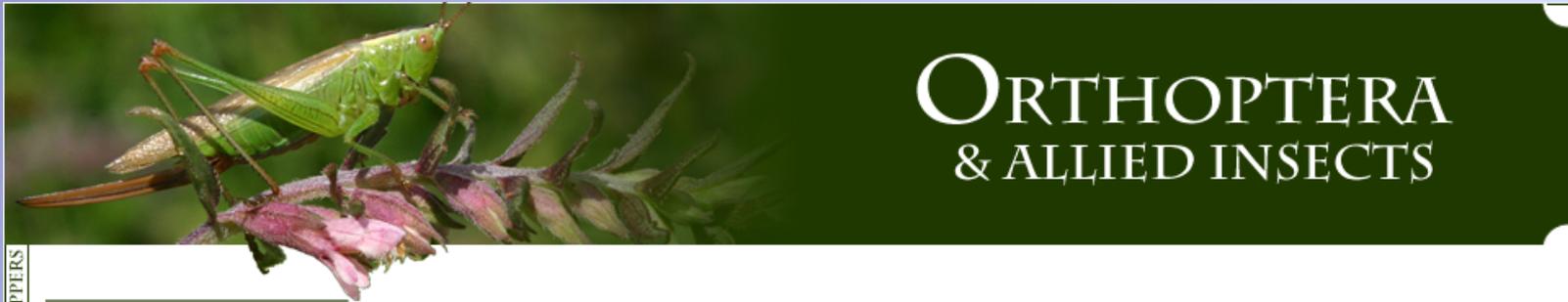
- atlases 1988 and 1997
- new atlas 2013?
- New Naturalist on Orthoptera due 2011

Orthoptera records on NBN Gateway:

- Orthoptera Recording Scheme
- Local Record Centres
- other datasets



**Orthoptera records on NBN Gateway
other than national scheme**



ORTHOPTERA & ALLIED INSECTS

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Orthopteroids of the British Isles Recording Scheme

Grasshoppers & Crickets with Earwigs, Cockroaches, Stick Insects and Mantids

The fauna of Orthoptera and allied insects is charismatic, diverse and abundant. Orthoptera provide one of the many sounds of summer; a time when they can easily be found in meadows, trees or bushes.

In the British Isles there are 27 native species of Orthoptera (grasshoppers and crickets) and a number of non-native, naturalised species. The Orthopteroids of the British Isles Recording Scheme includes these and also native and non-native allied species (insect groups historically considered closely related to the true Orthoptera): cockroaches, earwigs, mantids and stick insects.

Over the last few decades some native species of Orthoptera have expanded their distribution range and new species have arrived in the British Isles; almost certainly a consequence of our warming climate. "The remarkable range expansions observed for some Orthoptera species over the last two decades have shown, unequivocally, that where species are capable of exploiting new habitats, they have done so. Moreover, the profound changes that we have observed to date are clearly only the tip of the iceberg." (Dr Peter Sutton)

This is an exciting time to record and study Orthoptera and we look forward to receiving **your records**. Records will be made publicly available to all via the [NBN Gateway](#) after validation and also appear on the [species accounts](#).

Tettigonia viridissima (Linnaeus, 1758)

Great Green Bush Cricket

Taxonomy: Orthoptera>>Ensifera>>Tettigonioidae>>Tettigoniidae>>Tettigoniinae

Photos: Click on a thumbnail to see a larger picture.



Status: British Isles native species.

Description: Very large, leaf green cricket with a brown stripe along the back. The female has a long, slightly down-curved ovipositor.

Size: 40 - 55 mm

Wings: Both sexes have long wings that extend beyond the tip of the abdomen.

Stridulation: Loud and penetrating song that can be heard over a long distance. It is performed from the late afternoon into the night, often from bushes or trees.

Recordings: Note, your ability to play these recordings depends upon the configuration of your computer and browser.



The typical sound of the Great Green Bush-Cricket recorded with a bat detector
Source: Malcolm Lee

Tettigonia viridissima (Linnaeus, 1758)

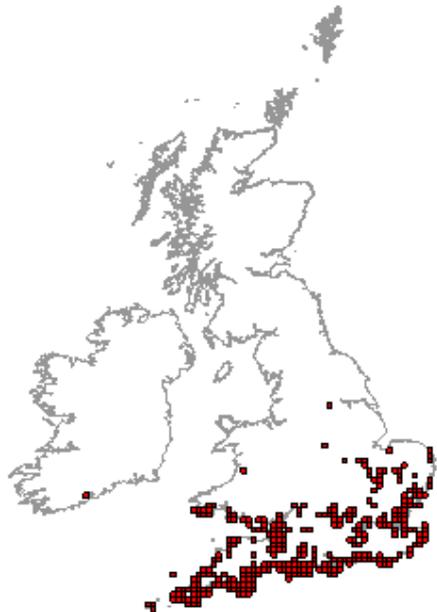
Great Green Bush Cricket

Food: Omnivorous, eating a variety of plants and insects.

Habitat: Overgrown hedges, bramble and bracken. Coastal scrub. Eggs are laid in the ground where they overwinter.

Phenology: Nymphs emerge in May and June. Adults present from late July until early winter.

Distribution: The records held by the [National Biodiversity Network](#) are shown in the map below.



[Open interactive map in new window](#)

Record a Sighting

Use this form to record the sighting of one of the species in the list of Orthoptera & Allied Insects. Attaching a photo will allow us to verify your record.

About You

About Where You Were

About What You Found

Select the species you have seen. If you can upload a photo we will try to verify your identification. Check the email verification box and we will send you an email confirming identification. Confirmed records will be forwarded to the National Biodiversity Network so please include a photo when you can.

Naming: Common Names Scientific Names

Order:

Species:

Number seen:

Accuracy of count:

Photo 1:

Photo 2:

www.orthoptera.org.uk

Site Survey Recording Form

Recorders may use this form to record all species seen at a particular site. It is intended for recorders involved in the scheme for whom there is a previously agreed means of verification.

Recorder	Site	Orthoptera	Dictyoptera	Dermaptera	Phasmida
<p>All the following information is required except altitude which is optional. Selecting habitat may require you to complete several selections from a hierarchy of successive lists. Select 'Remember site' and we will save these details on your computer for your next visit.</p>					
Grid Reference:	<input type="text"/>				
Locality:	<input type="text"/>				
Vice County:	<input type="text" value="Please choose one..."/>				
Habitat					
level 1:	<input type="text" value="Please choose one..."/>				
level 2:	<input type="text" value="Please choose one..."/>				
level 3:	<input type="text" value="Please choose one..."/>				
Altitude (m):	<input type="text"/>				
Date (dd/mm/yyyy):	<input type="text"/>				

www.orthoptera.org.uk



Watch the video at www.orthoptera.org.uk/videos.aspx

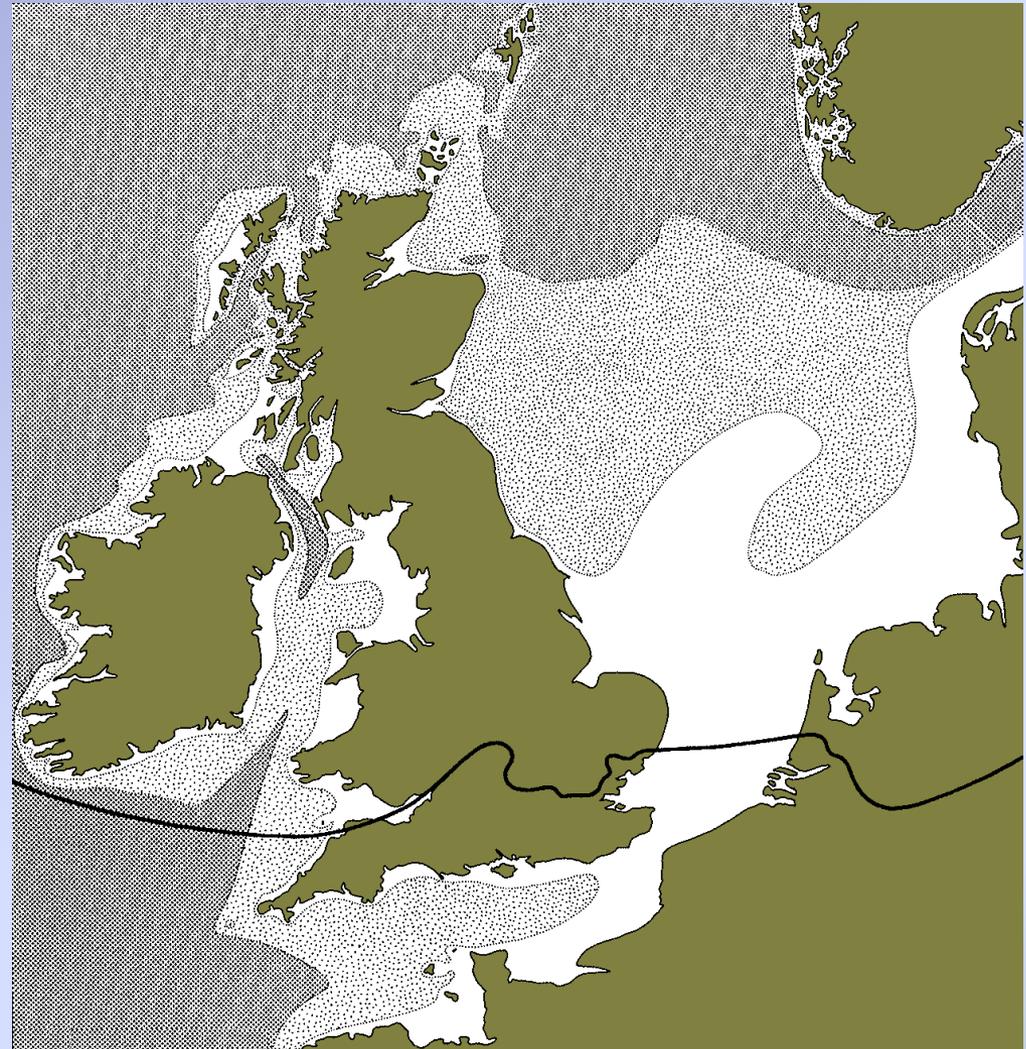
Rufous grasshopper courtship

video by Ted Benton

Changing Orthoptera distributions

Many factors influence distributions:

- climate
- geography
- human impact e.g. land use



- Coastline ca. 12,000 years ago
- Coastline ca. 9,000 years ago
- Southern limit of maximum glaciation

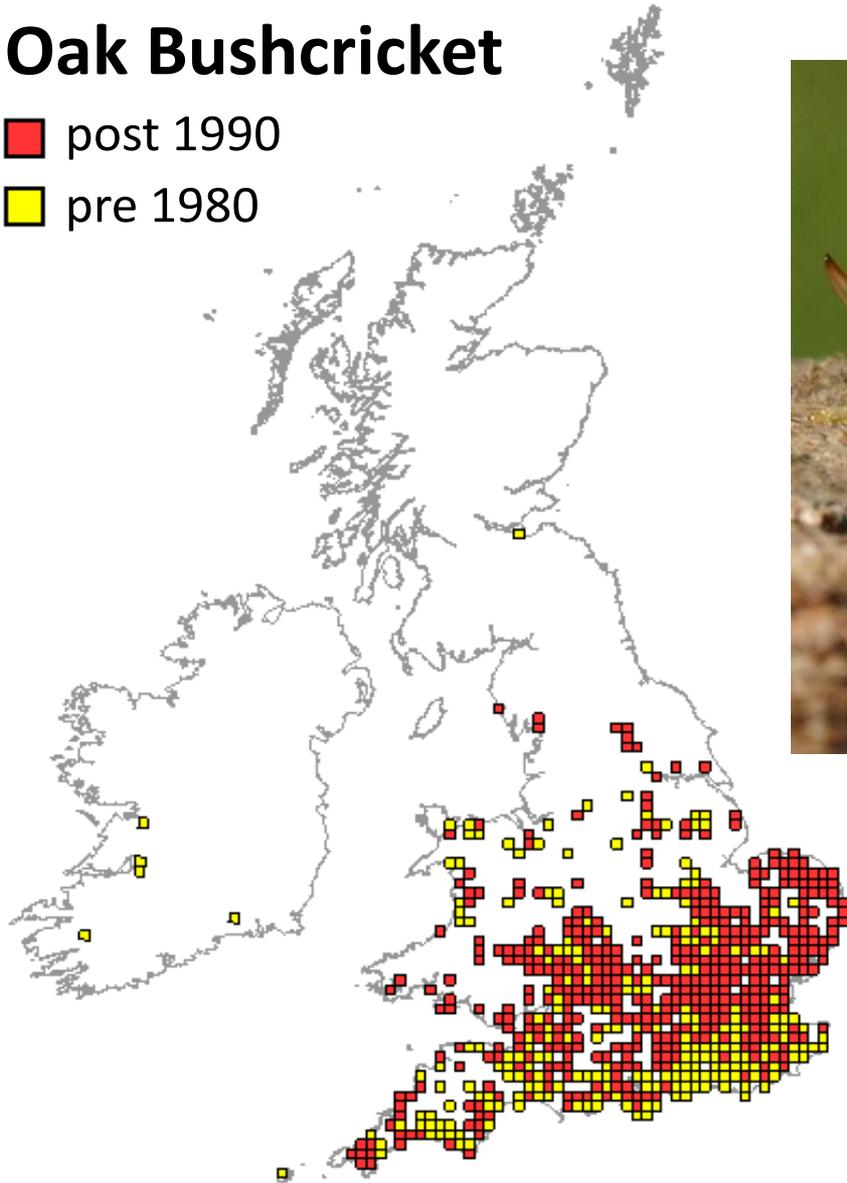
adapted from D.R.Ragge

Using Scheme data to study change in Orthoptera

Oak Bushcricket

■ post 1990

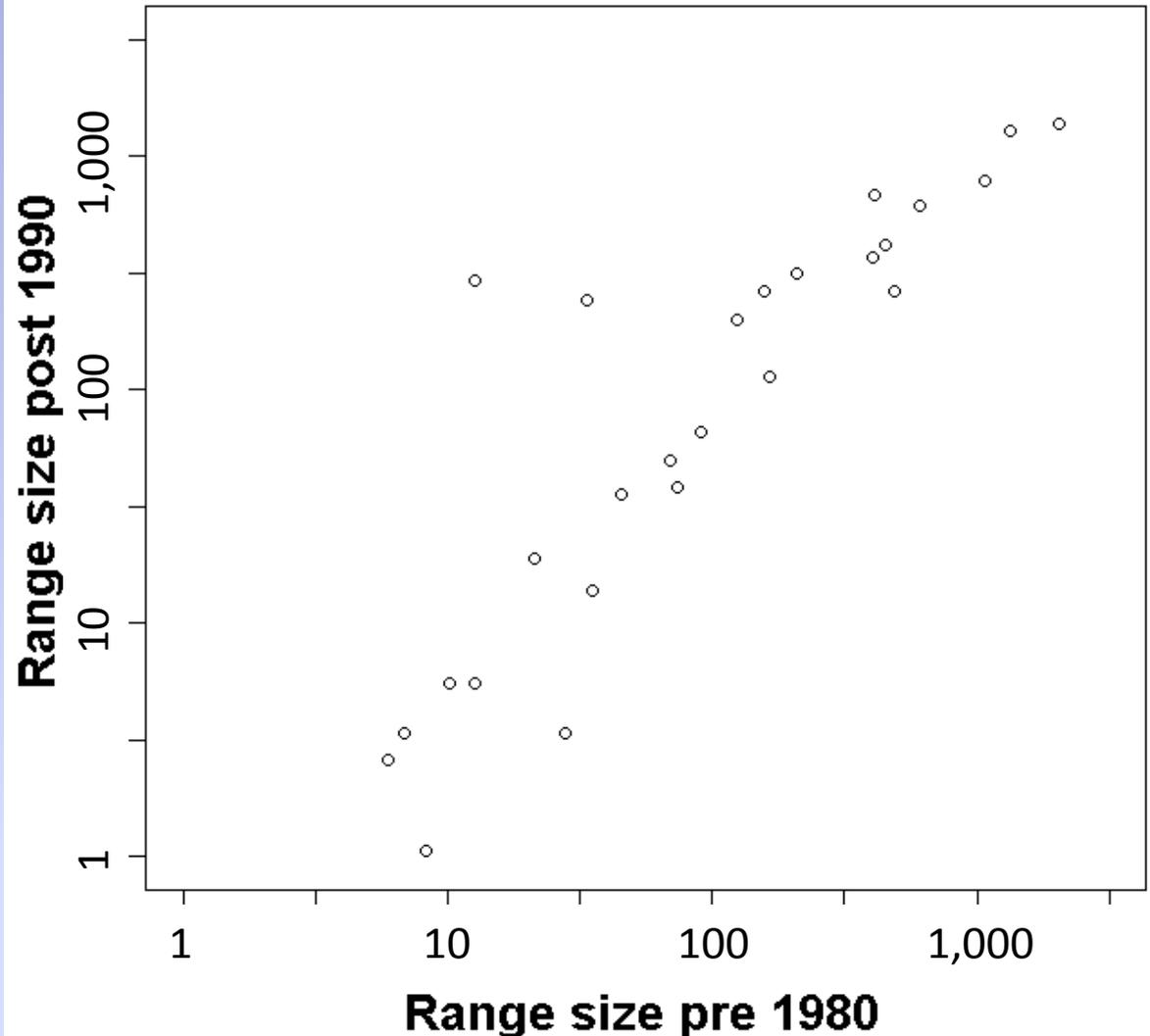
■ pre 1980



Oak Bushcricket Photo: David Browne

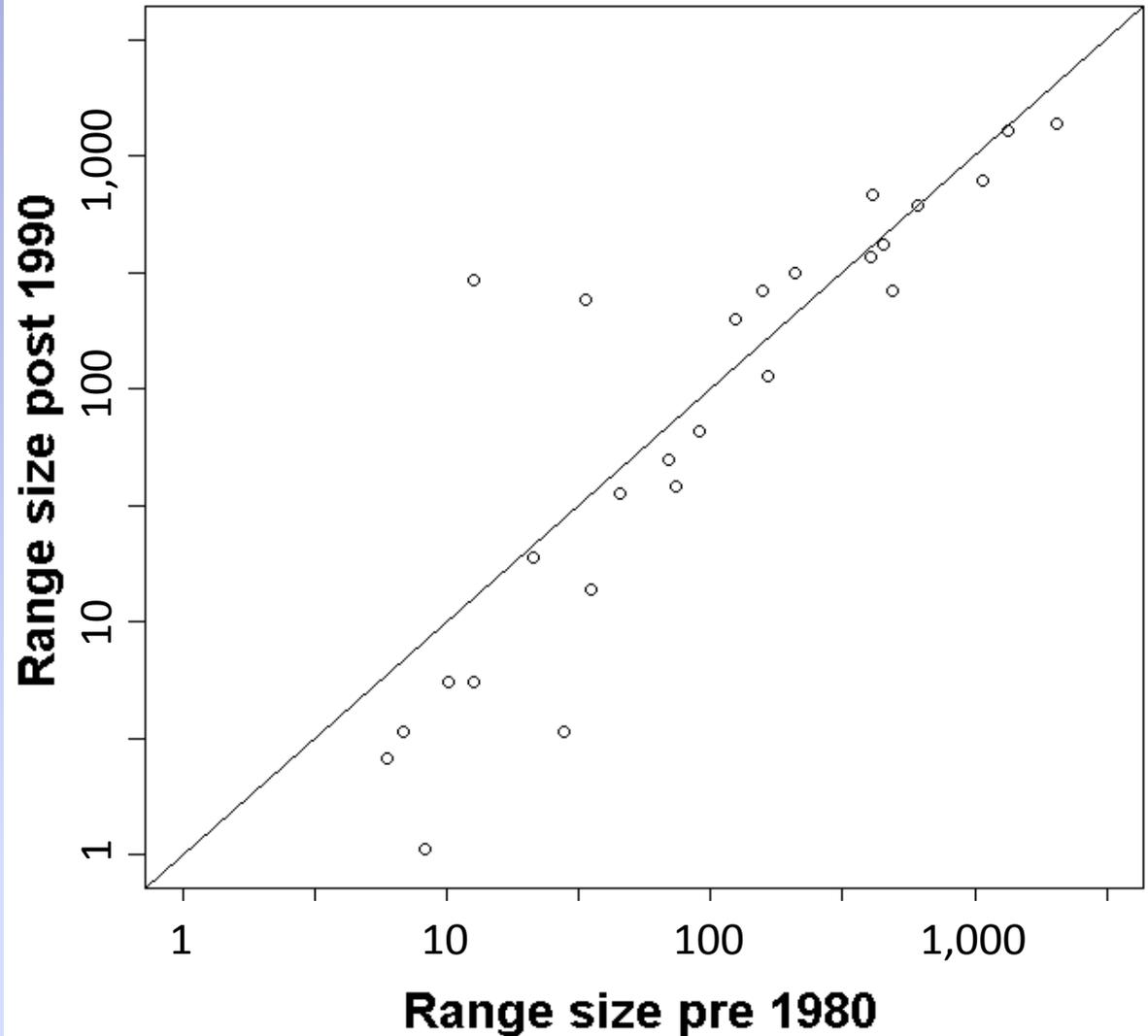
Calculating Range Change

- Plotting counts of squares in period 1 vs period 2
- robust, simple method (Telfer *et al.* 2002)



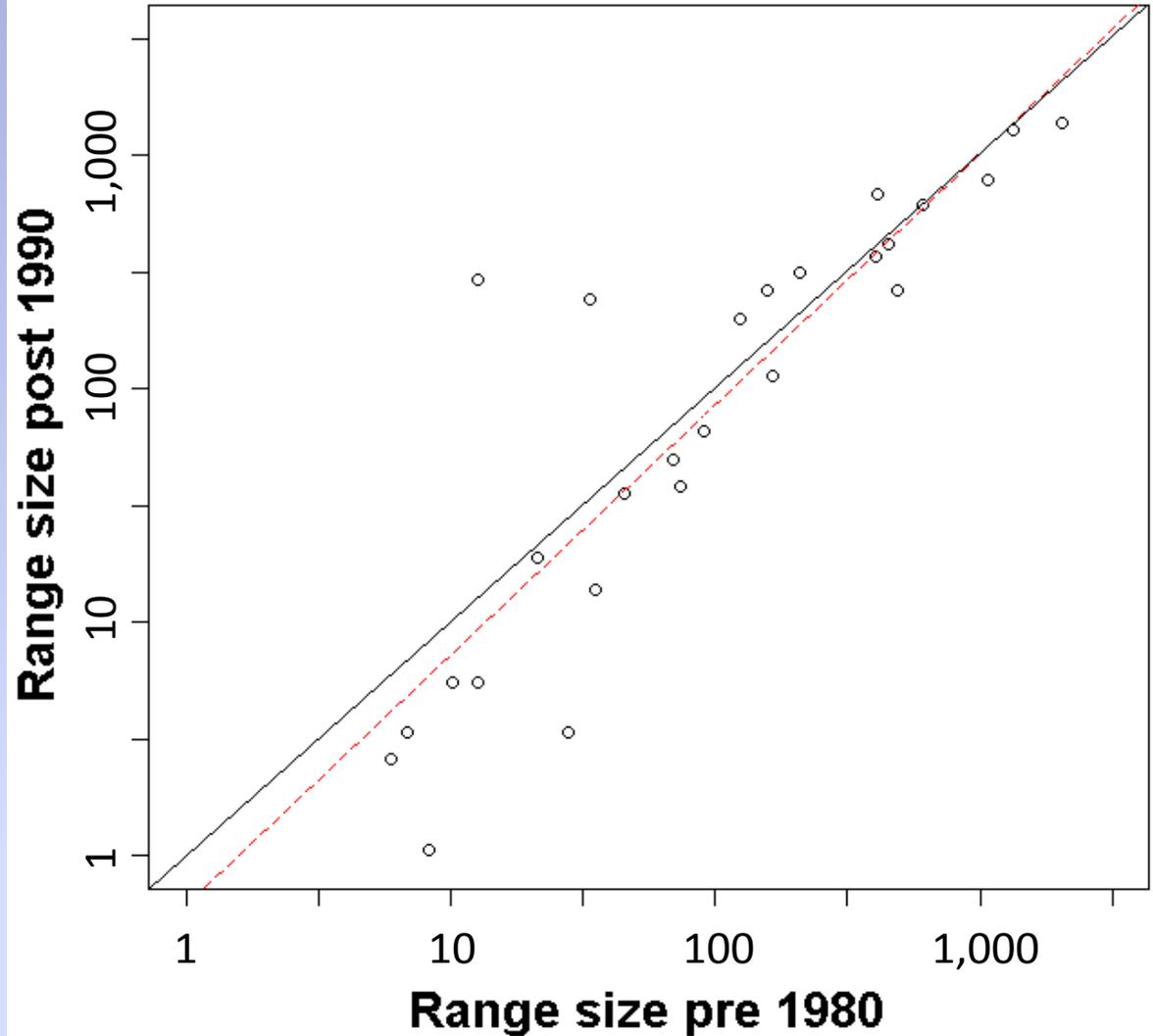
Calculating Range Change

- unity line indicates no change
- but: does not take into account varying recorder effort



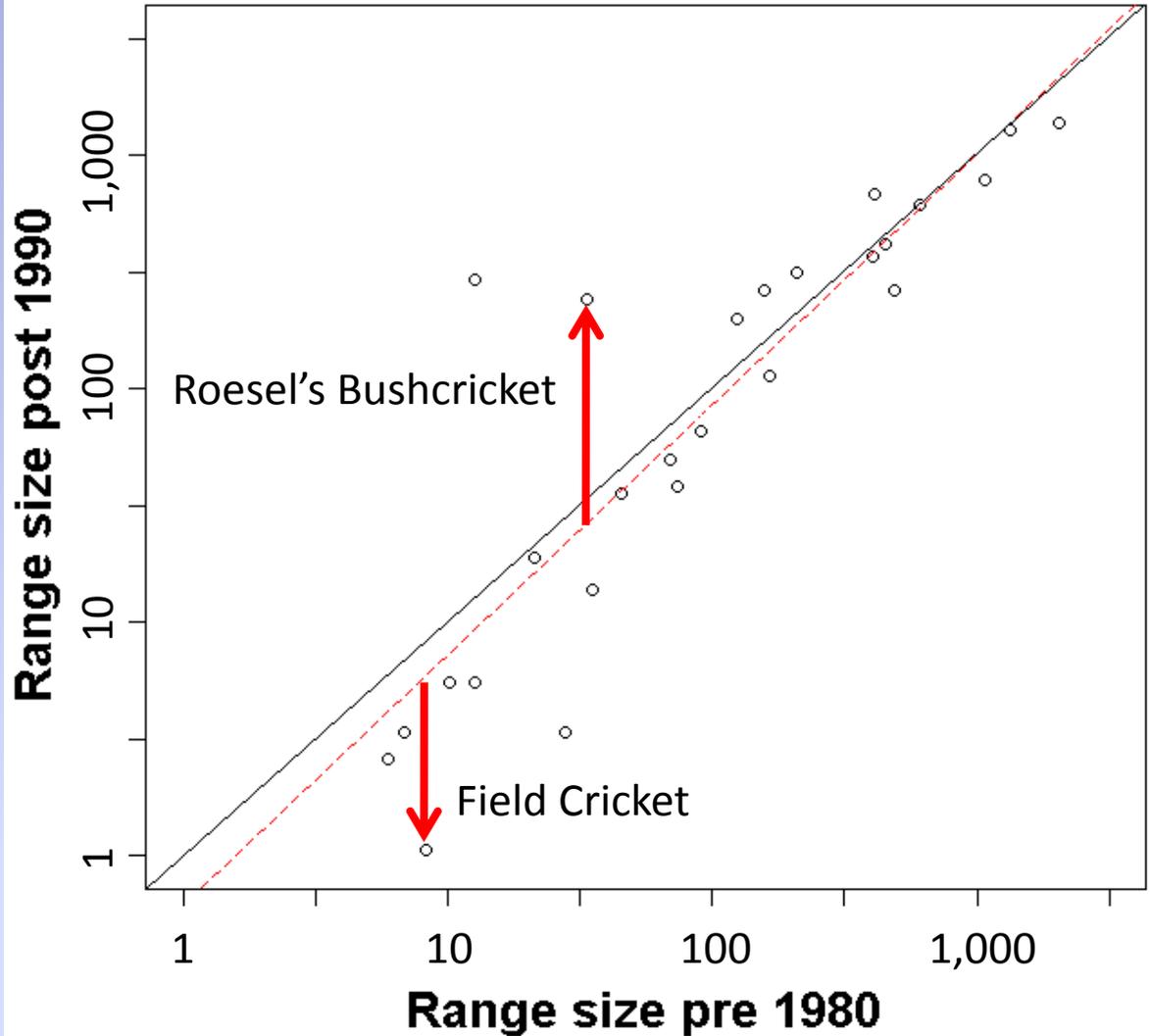
Calculating Range Change

- fitted regression line shows mean change for group of species

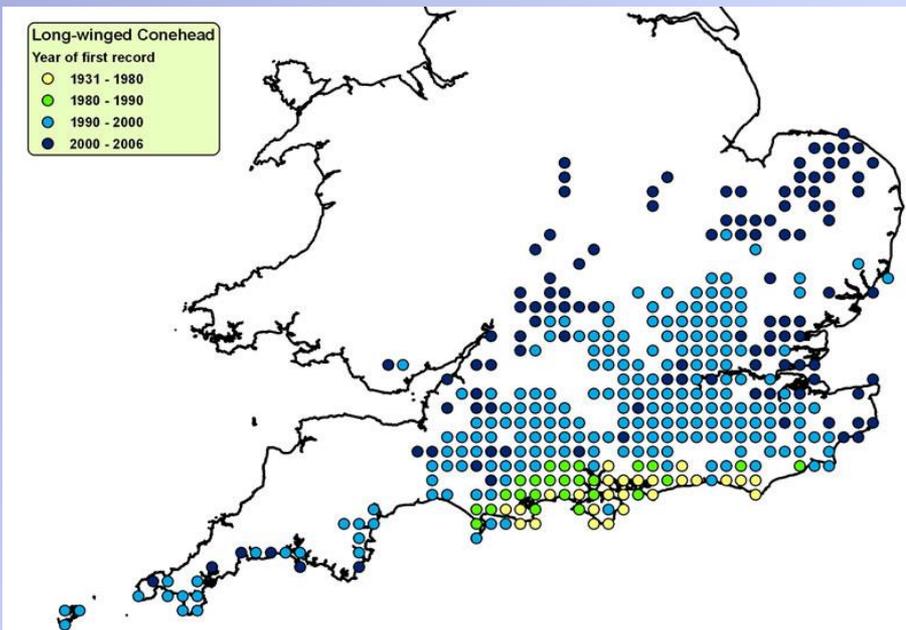
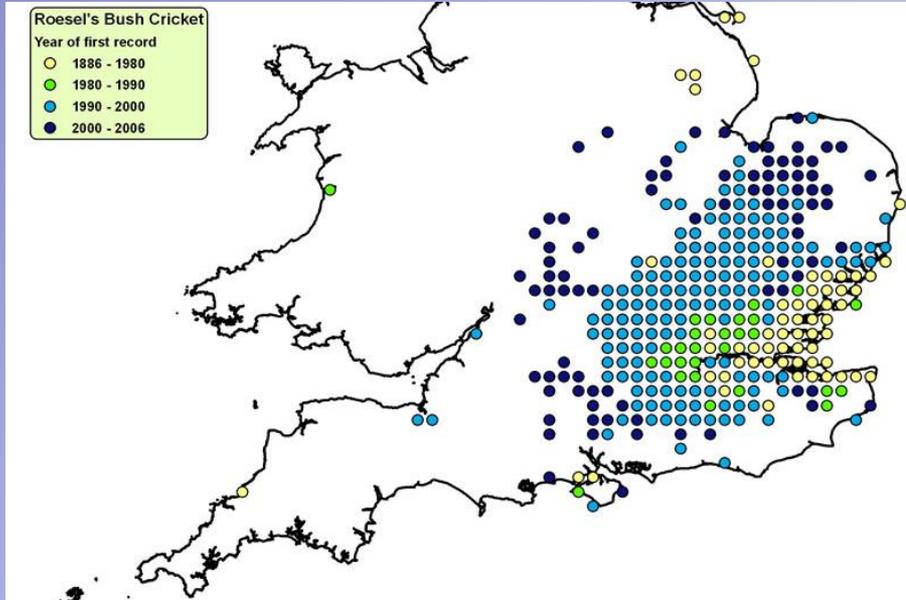


Calculating Range Change

- distance from fitted line measures relative change of a species
- independent of recording effort



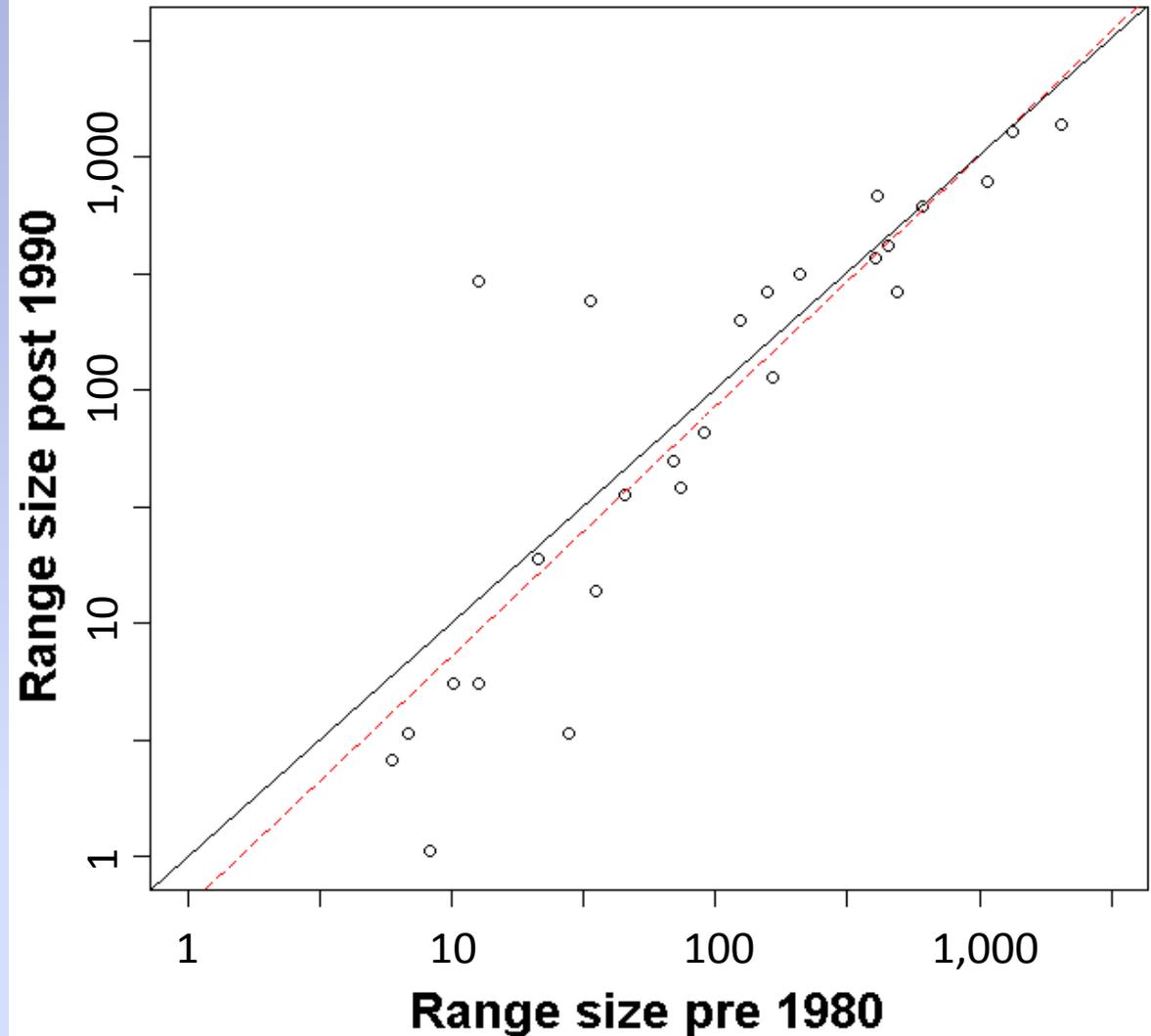
Changing Orthoptera distributions



Relating changes to species traits

Do species that do well / badly have any traits in common?

- traits database
- relate traits to range change index values



Relating changes to species traits

Results of traits analysis:

- **habitat generalists** do better than specialists



Relating changes to species traits

Results of traits analysis:

- **habitat generalists** do better than specialists
- species that **mature later** in the year do better



Speckled Bushcricket Photo: David Browne

Relating changes to species traits

Results of traits analysis:

- **habitat generalists** do better than specialists
- species that **mature later** in the year do better
- species with **wing-dimorphism** do well



Photo: David Browne



Roesel's Bushcricket Photo: Gilles San Martin

Conclusions

- the Orthoptera & Allied Insects Recording Scheme collates distributions for Britain and Ireland
- www.orthoptera.org.uk
- using Scheme records, changes in distributions can be measured
- simple distribution data help to monitor welfare of species and understand species biology
- future work: relate changes directly to climate data



Thanks

- all Orthoptera recorders
- Peter Sutton, Helen Roy, David Roy, Chris Thomas
- Jim Bacon
Colin Harrower
Marco Girardello
Gary Powney



Great Green Bushcricket

Photo: David Browne