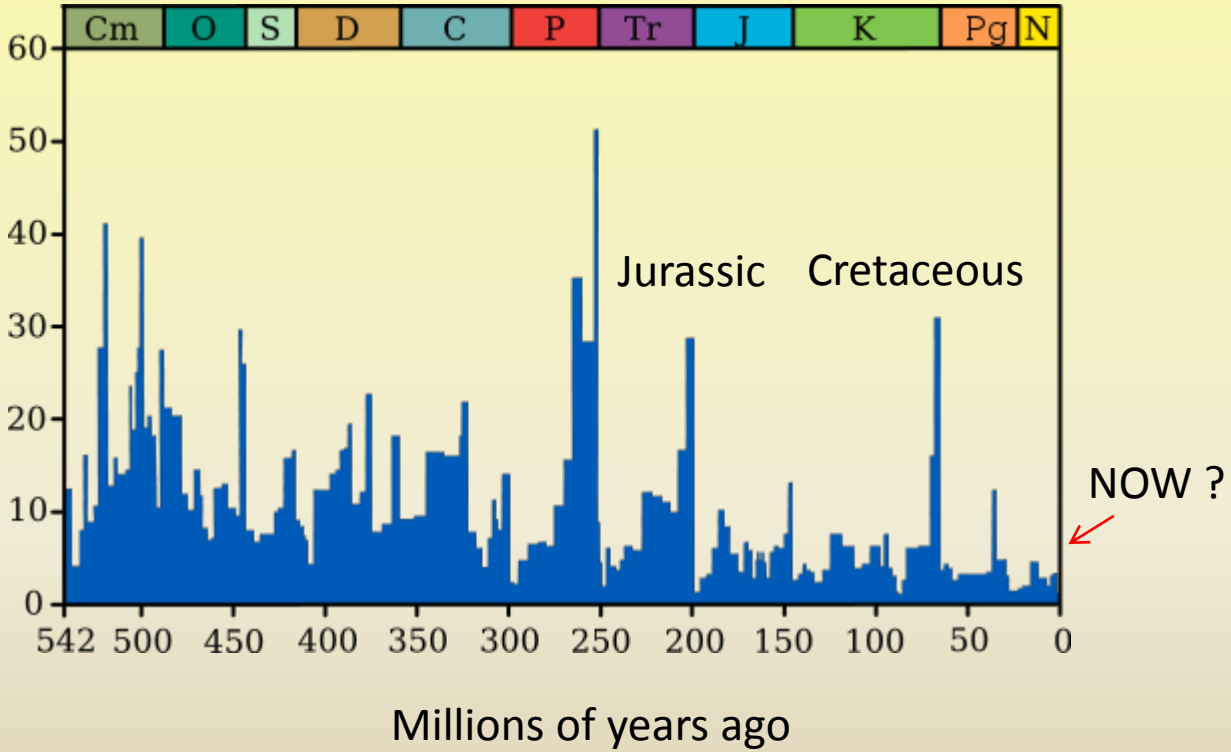
Citizen Sciences in France

A Revolution in our Understanding of Biodiversity Profiles

ZUCCA Maxime

6th major extinction crisis : the need for understanding

extinction intensity during phanerozoic



Millions of years ago

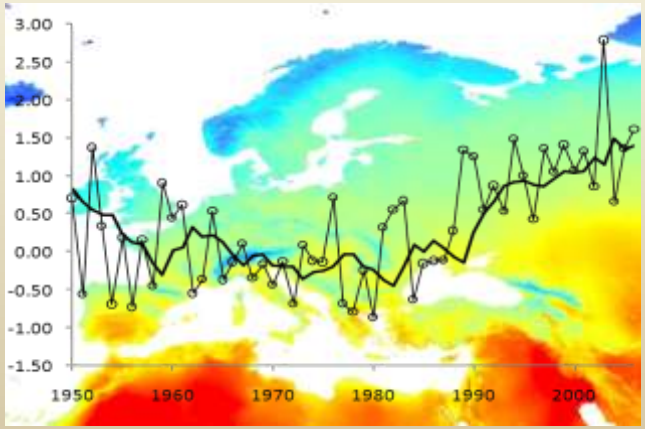
Ecosystem services ??

Mechanisms at play ????

Urban Sprawl

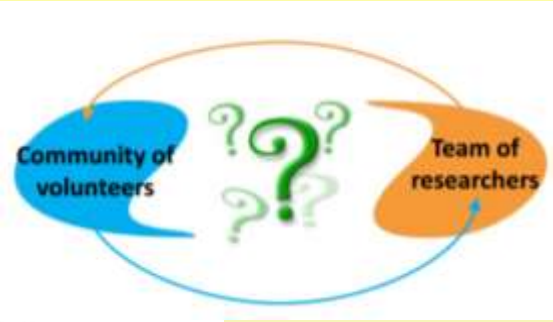
Habitat loss and fragmentation

Climate change

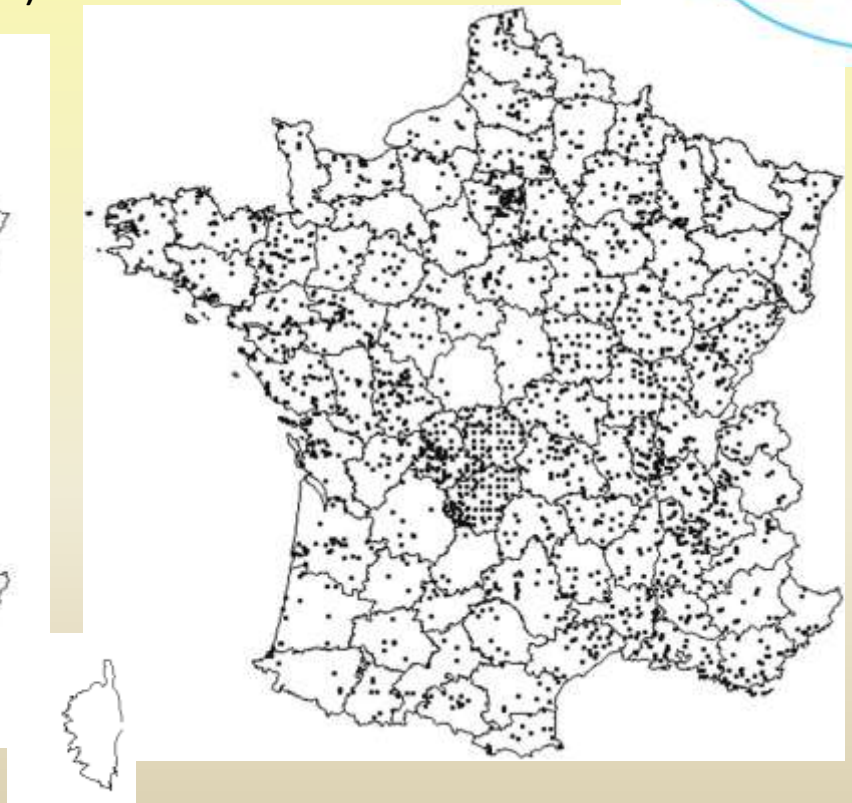


Multiplying the collect of data by involving hundreds of observers

➔ Large scale, long term



« Citizen science, the involvement of volunteers in research »
(Dickinson, Zuckerberg, & Bonter 2010)



500 km

big datasets allowing sufficiant statistical power

- How to monitor ?

x 10 000 civil servants ?

Or

x 10 000 volunteers

Success dependant upon participation rate !

Main keys of long term success of a citizen science program

- Standardised protocol allowing replications in space and time, plus sampling strategy when possible

- Attractive, fancy, audience targeted

Main keys of long term success of a citizen science program

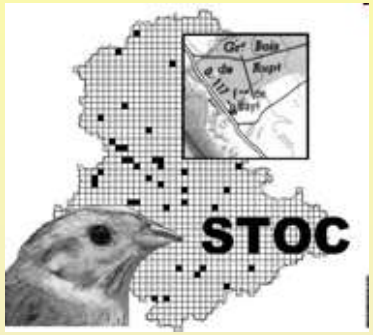
- Enhancing for the participant (self-learning i.e. turning beginners into experts ; community appartenance…)

- Feed-back between scientists and volunteers :
  - Scientific results
  - Improvment suggestions

French offer

Naturalists' Citizen Sciences Programs

Birds



N = 1000/year

Butterflies

N = 100/year

Steli
Suivi Temporel des Libellules

Dragonflies
(New)

Bats

N=200/year

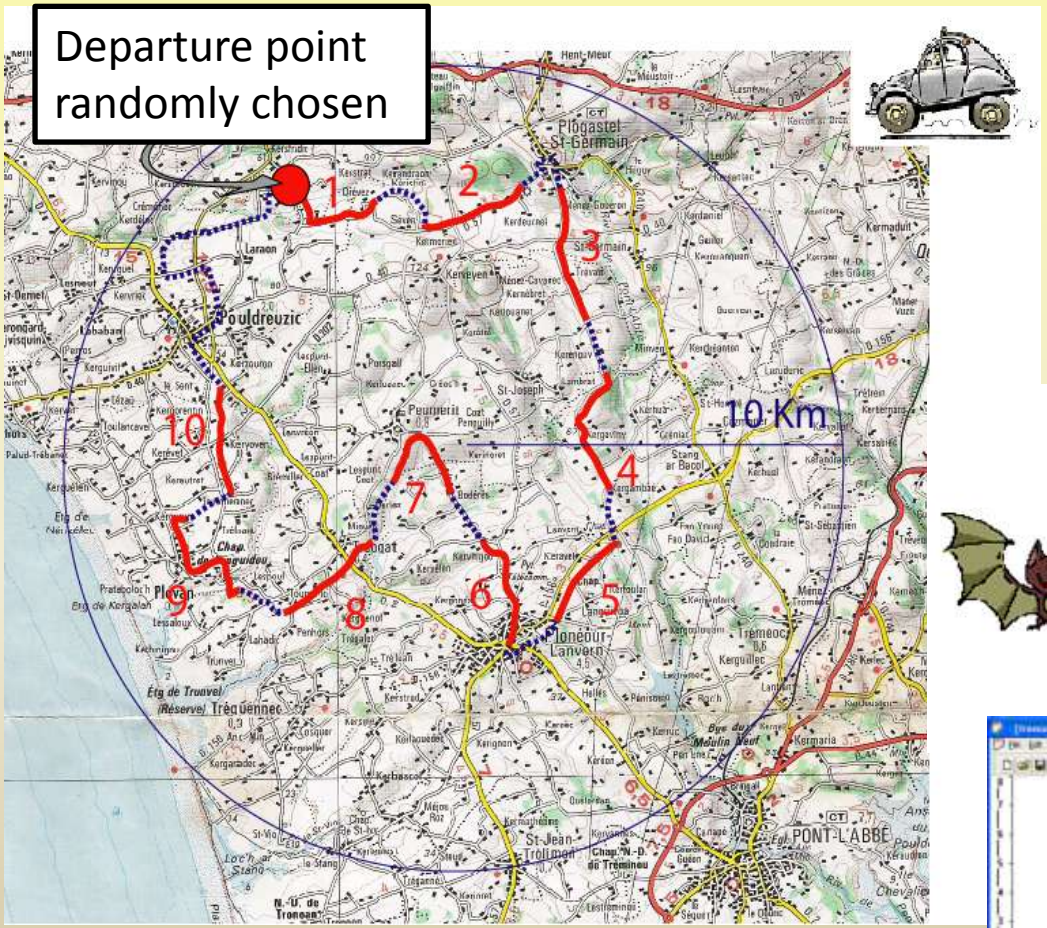
vigie-flore

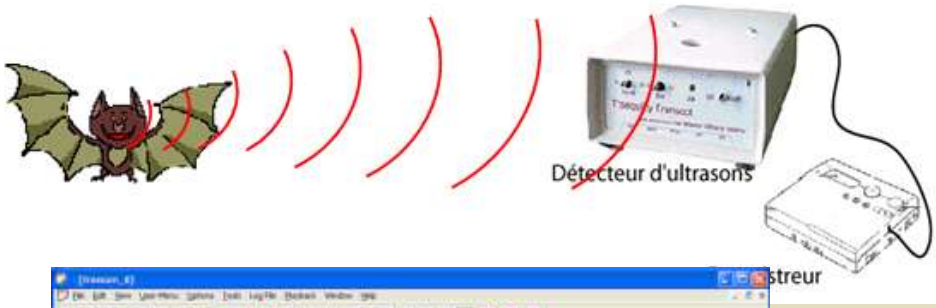
Plants
N = 100/year

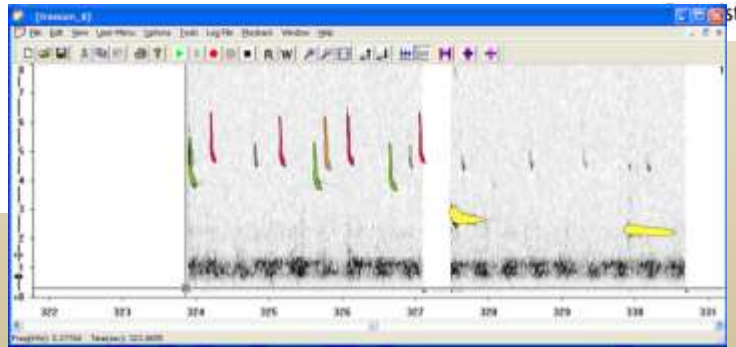
Common Bird census

Bats Survey

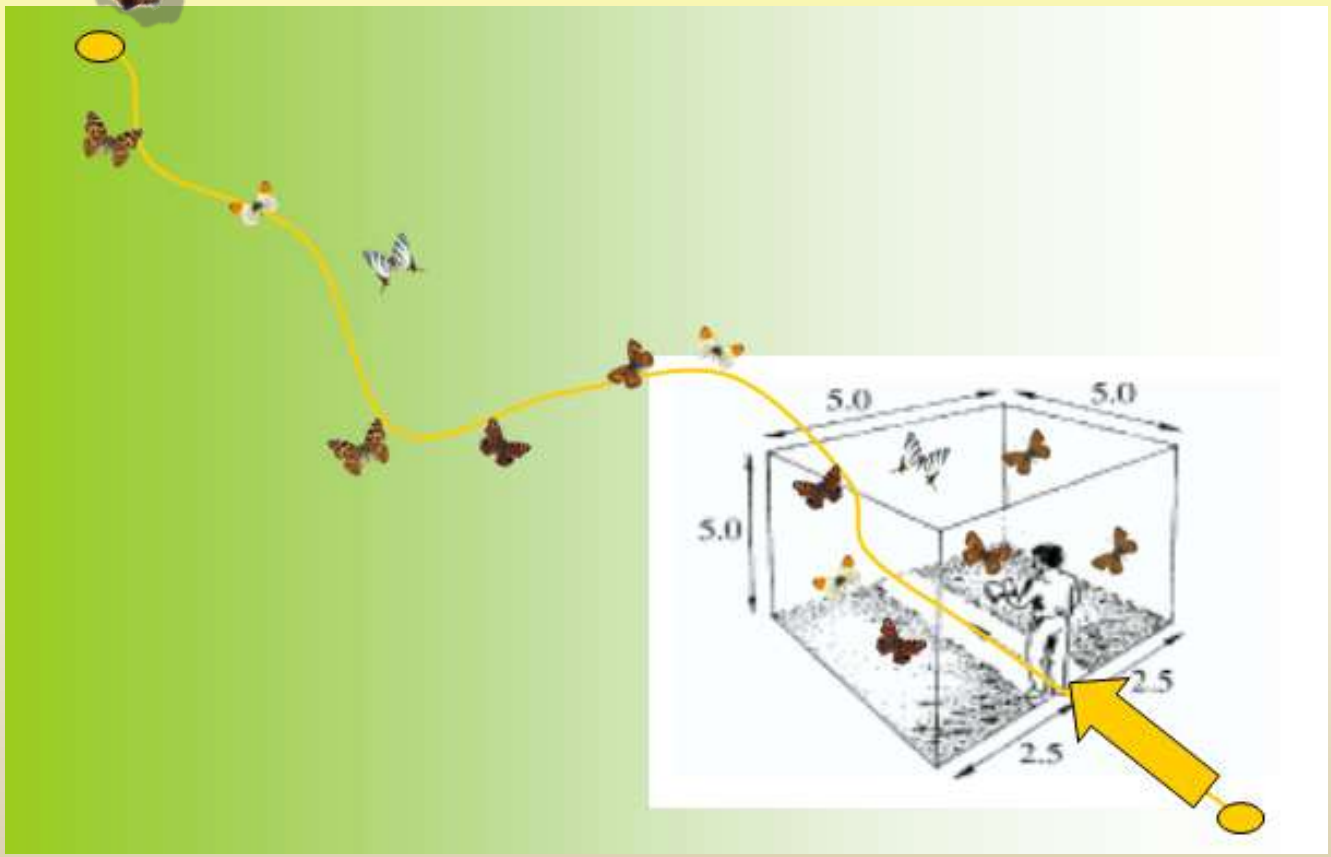
Departure point randomly chosen







Butterflies Census



Start

General public' Citizen Sciences Programs

Observatoire PAPILLONS Jardins

Garden Butterflies :
N = 2500/year (>10 000 total)

OPÉRATION Escargots

Garden Snails
N = 600 for the first year

Garden Birds ; New

SPIPOLL

Photographic survey of pollinators (SPIPOLL)
N = 2100 « collections » / year

sauvages de ma rue

Plants in urban streets

The Photographic Survey of Pollinators (Spipoll)

… all the insects visiting the flowers.

Lierre terrestre, 16-18/04/09, Creuse, 100 min

				
Bee 1	Bee 2	Bee 3	Bee 4	Bourdon 1
				
Bourdon 2	Bourdon 3	Bourdon 4	Syrph	Fly 1

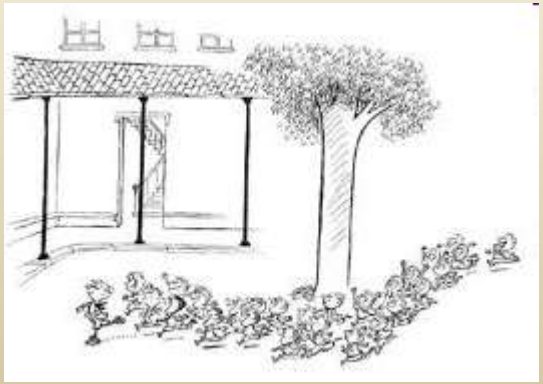
Targeted audiences

- Farmers

- Gardeners from public parks

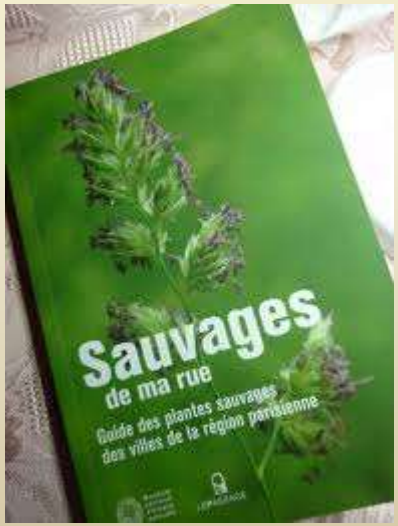
- Pupils

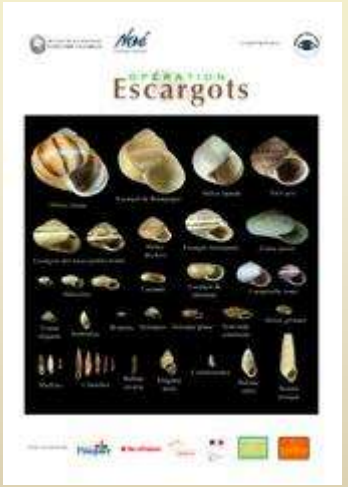
LIFE +



Much more tools needed…

- Website
- Identification sheets
- Book





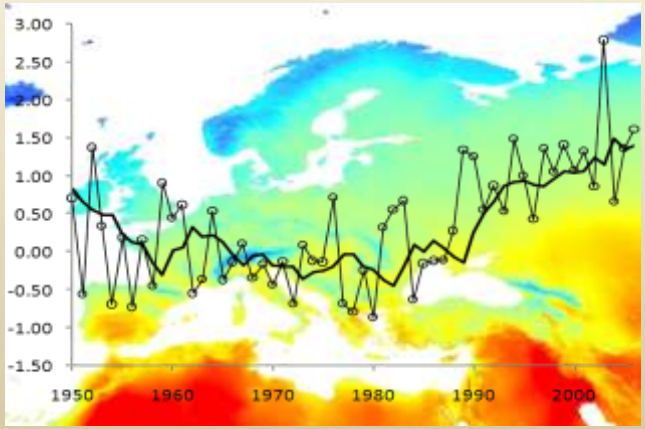
Many findings of high conservation interest

1. mechanisms at play

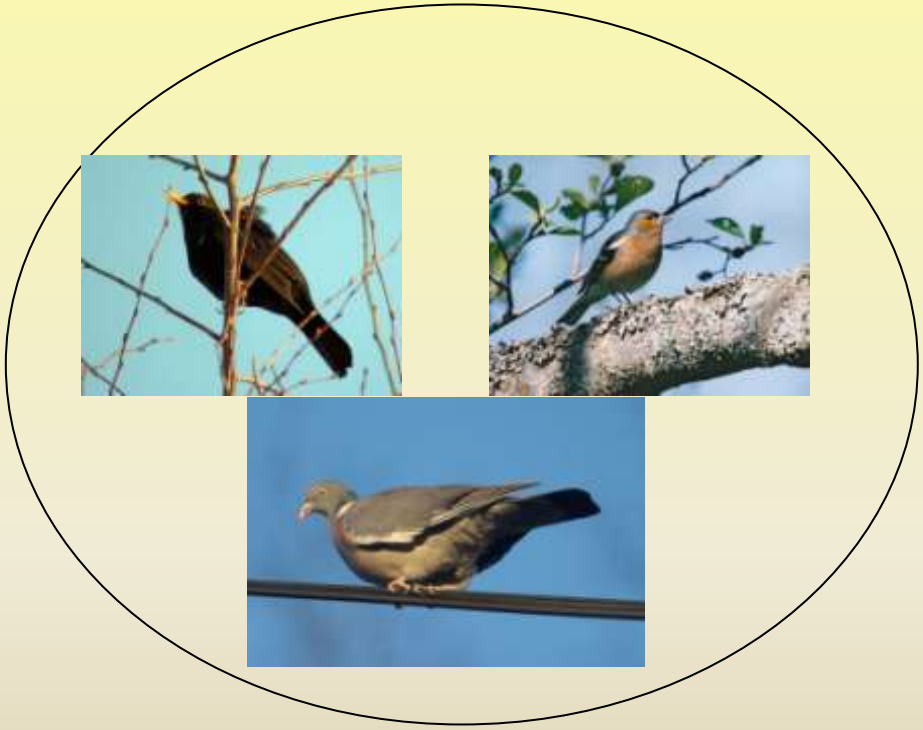
Urban Sprawl

Habitat loss and fragmentation

Climate change



Global changes : and the winner is…

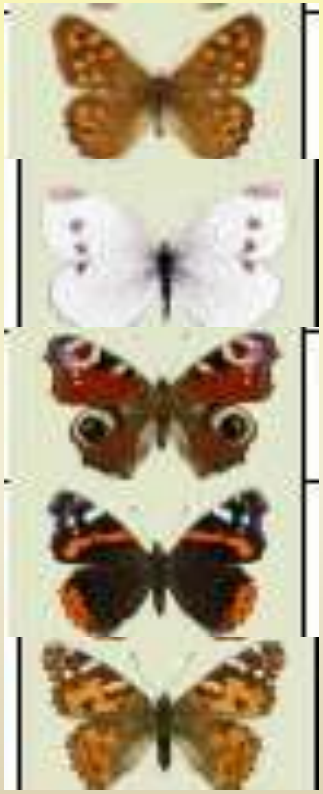


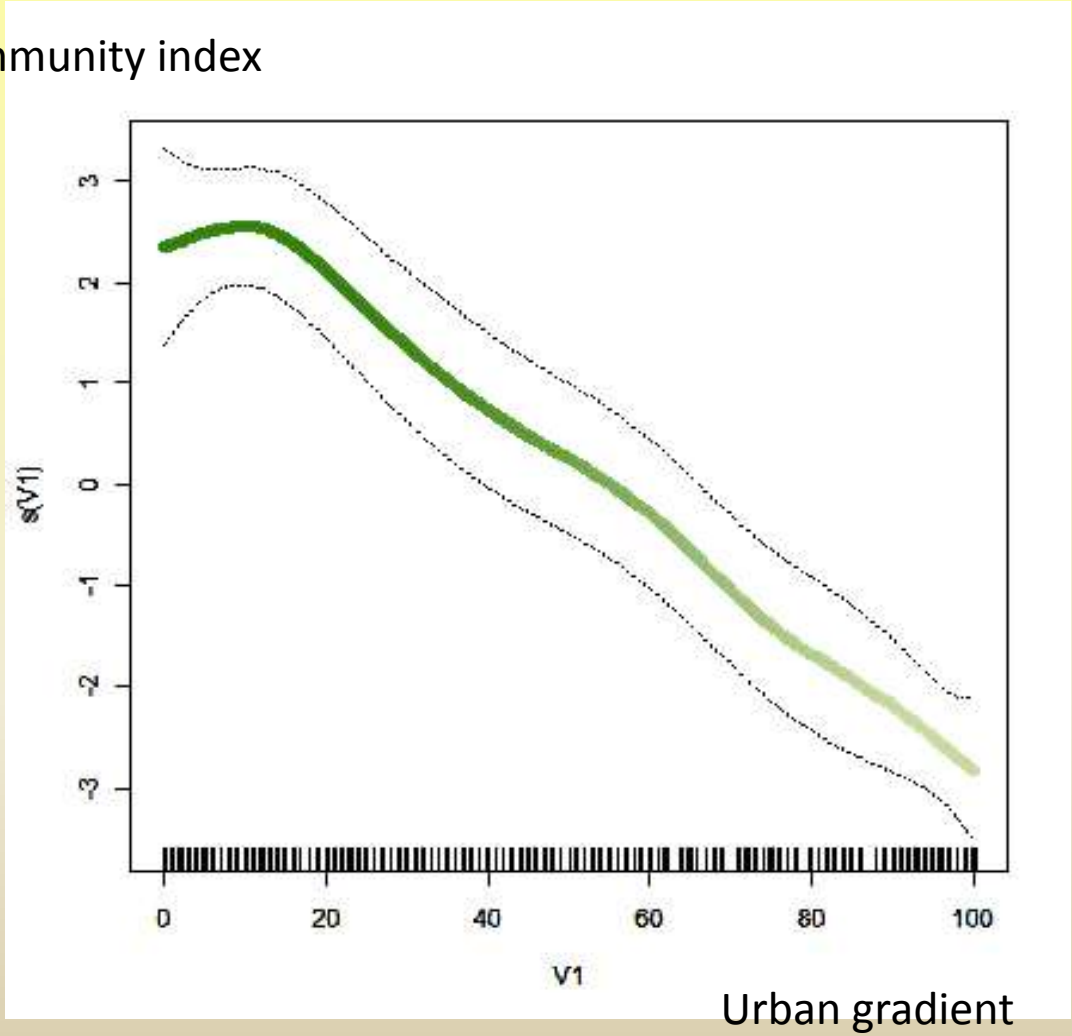
…Biotic homogenisation

Garden Butterflies

Community index

Urban tolerants

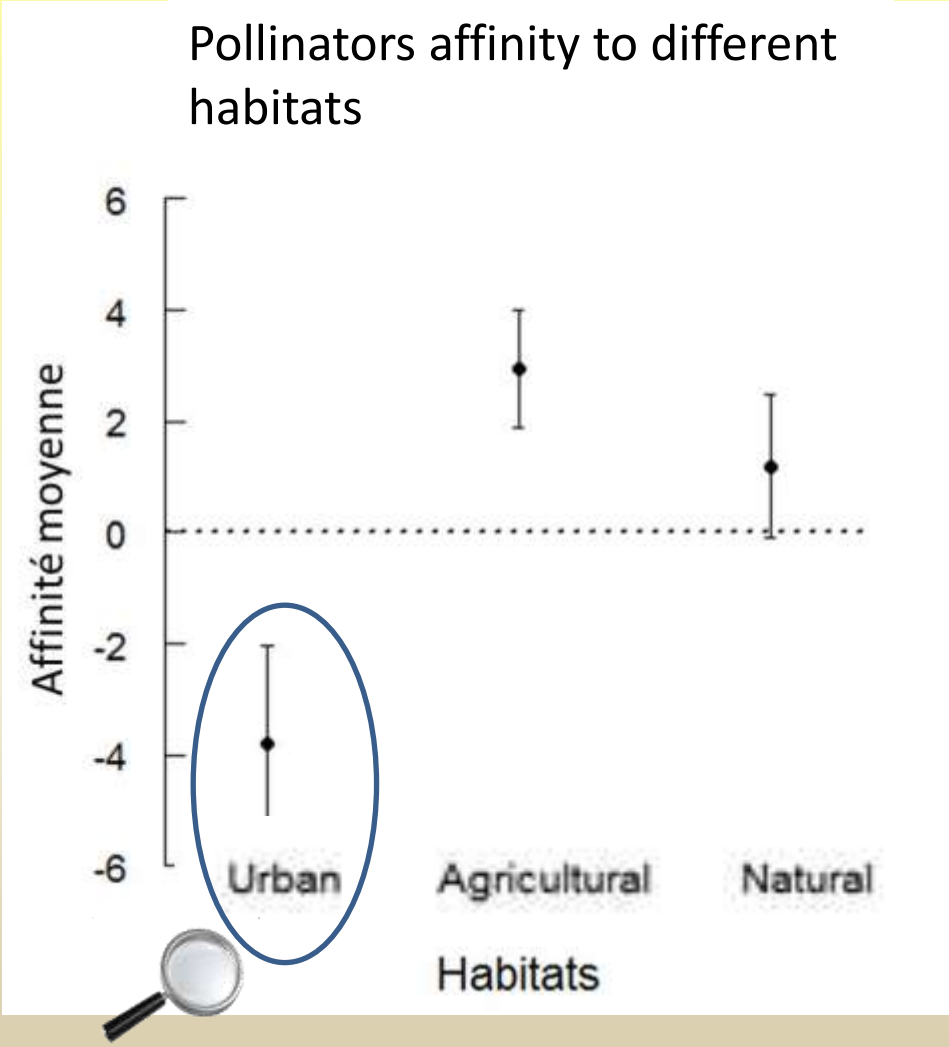


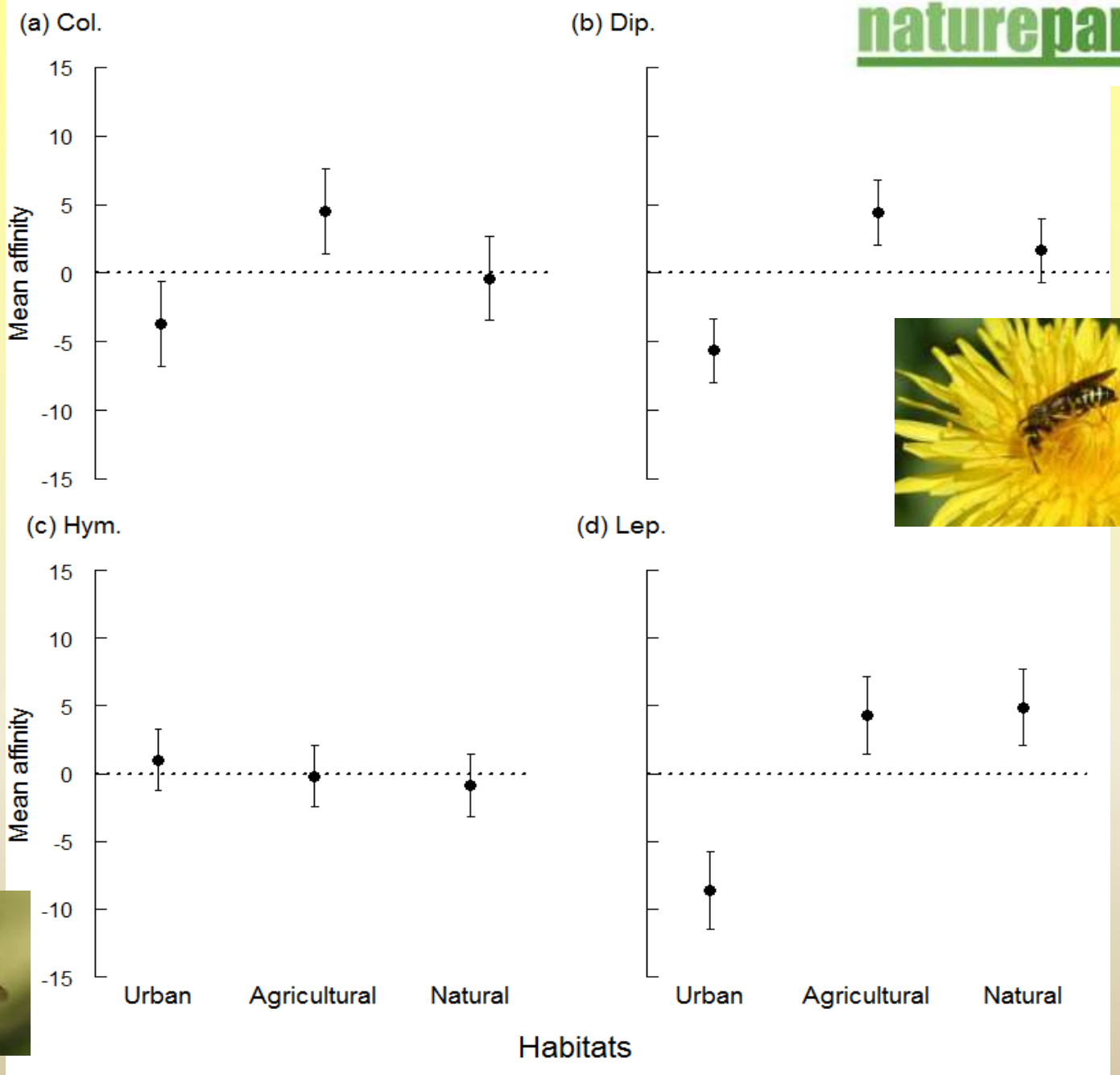


Urban gradient

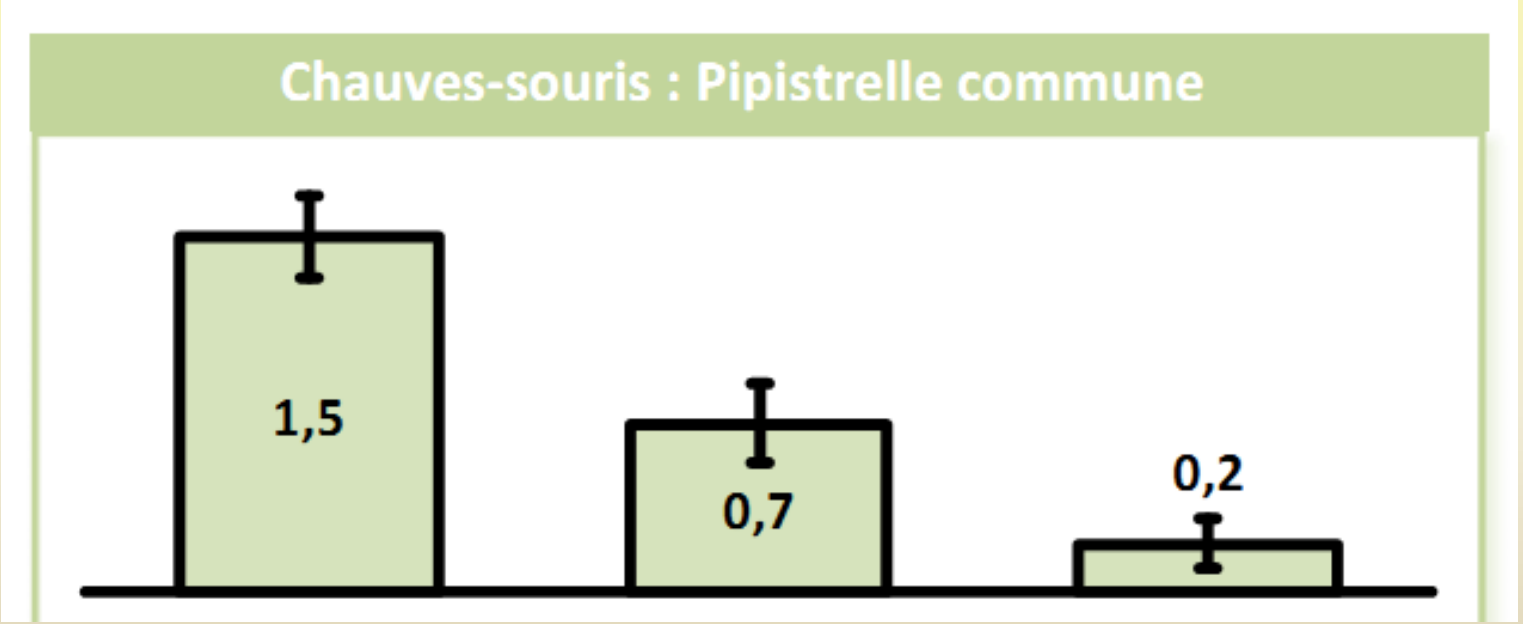
Urban avoiders

Pollinators tend to avoid cities and to plebiscit agricultural landscapes

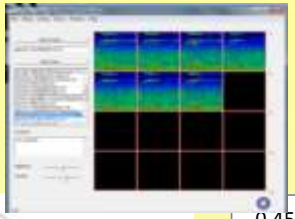


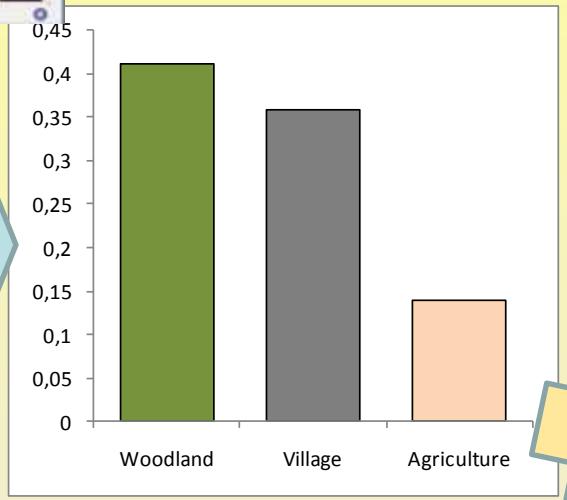


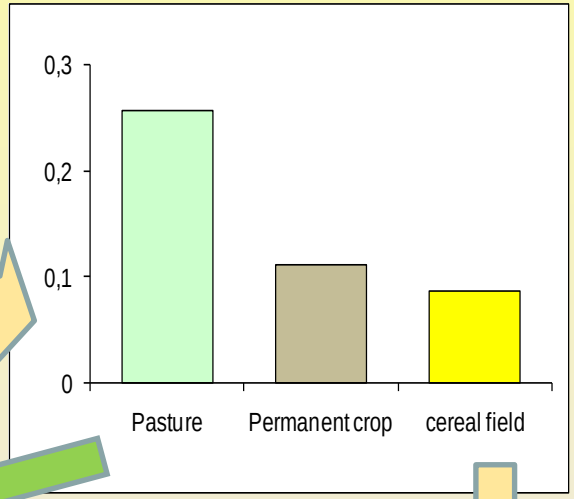
Common Pipistrelle

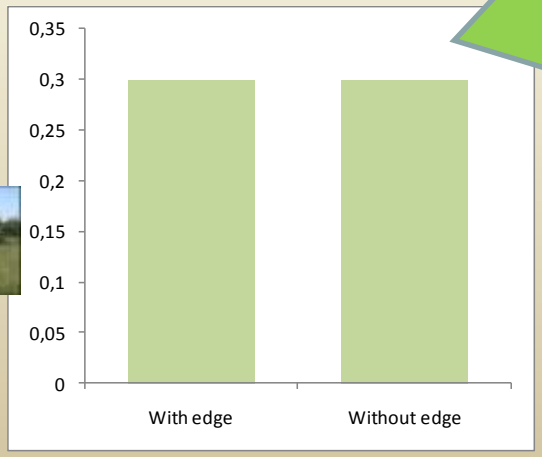


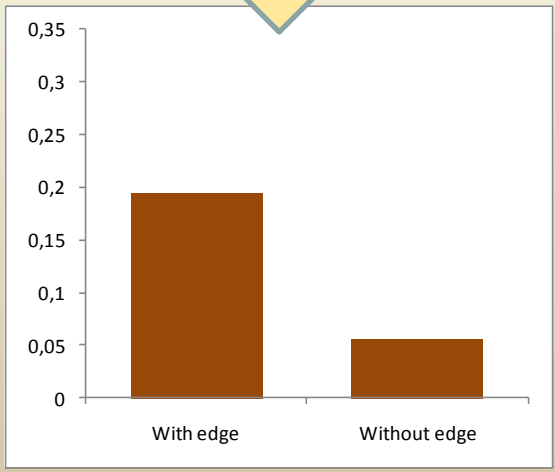
Landscape use by the Serotine Bat







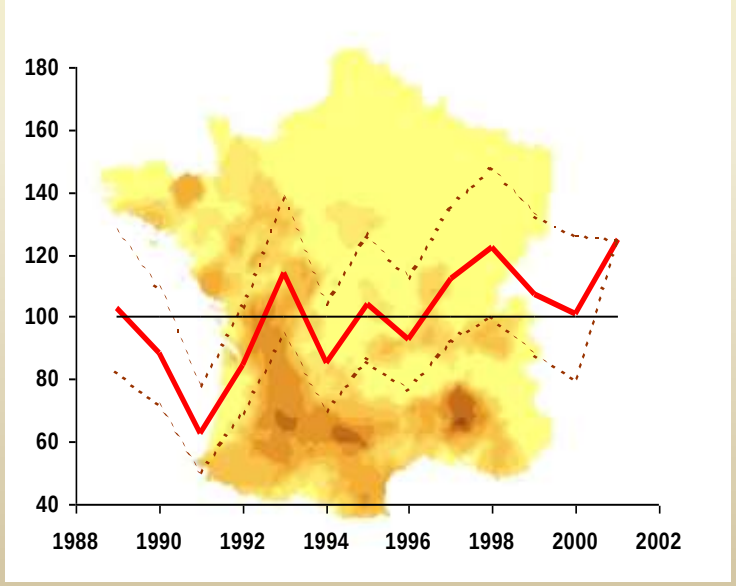


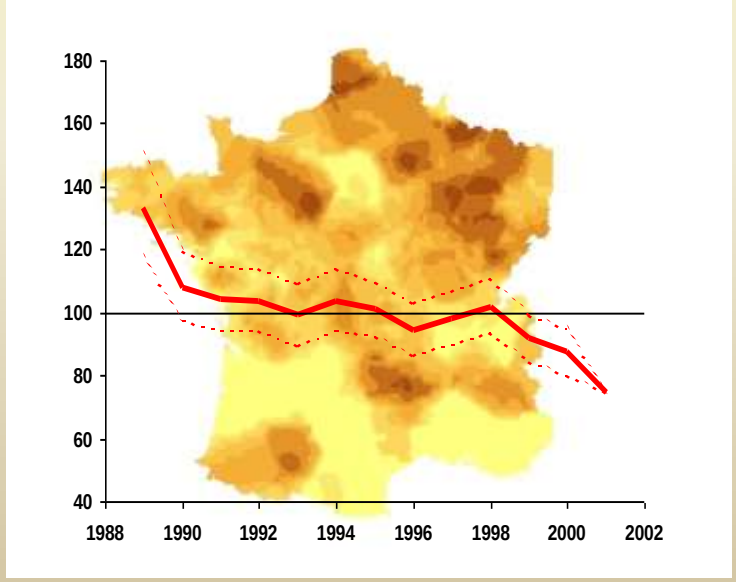


Climate change

Cirl Bunting: + 40 %

Yellowhammer : - 30 %

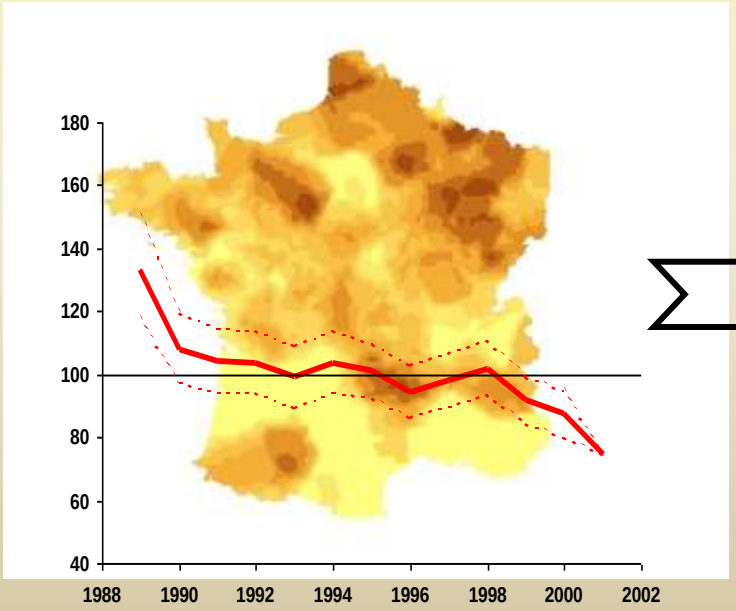


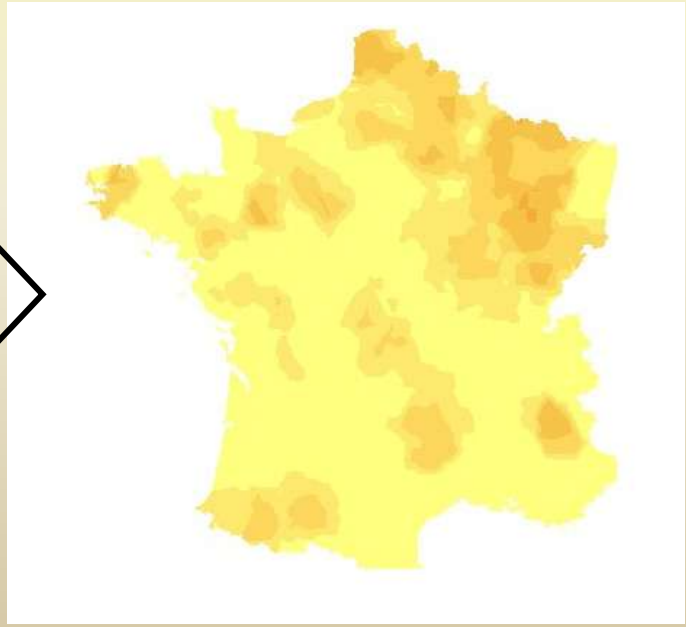


Climate change

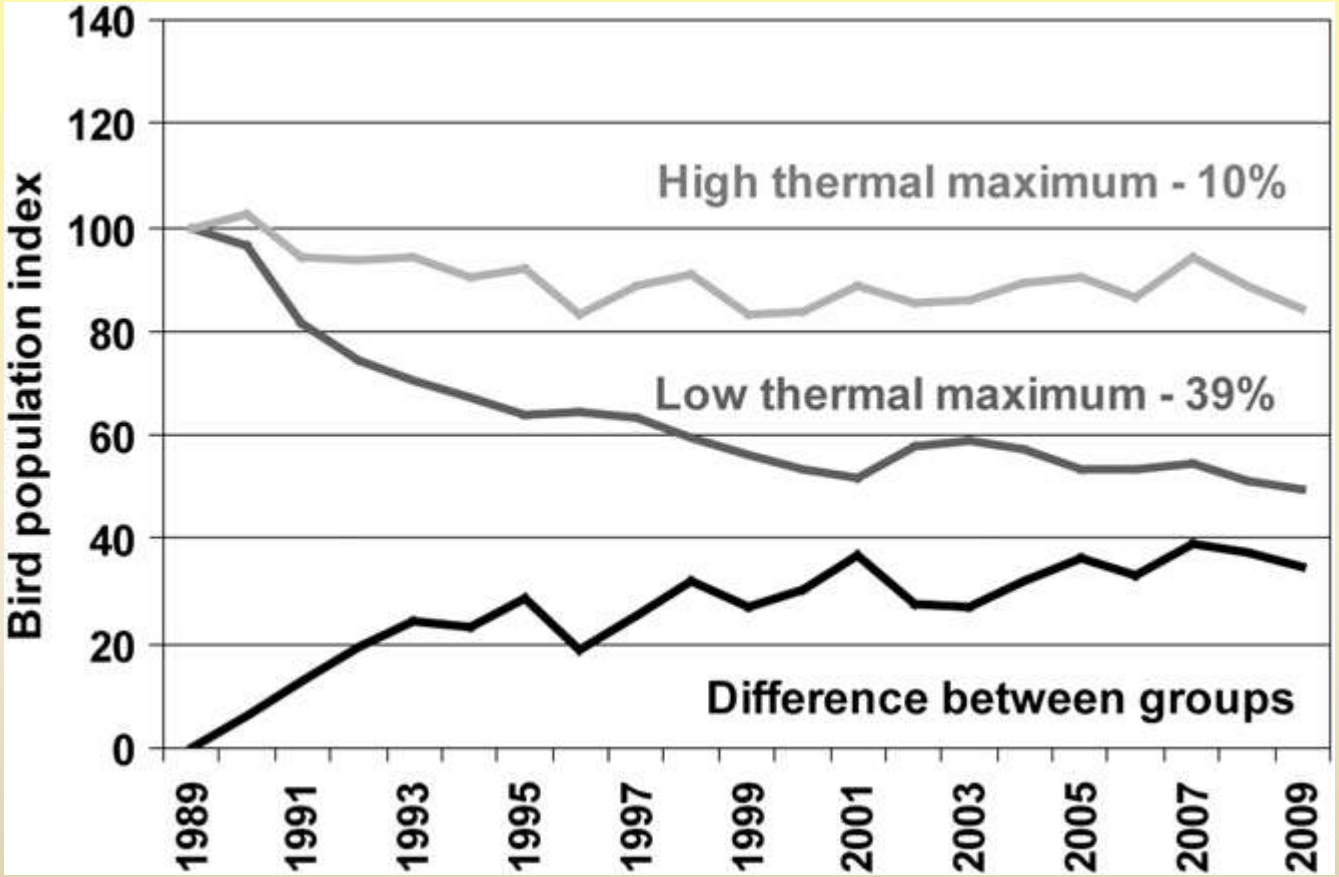
PROJECTION :
Scenario +3° C
Hypothetical map of the Yellowhammer

Yellowhammer: - 30 %

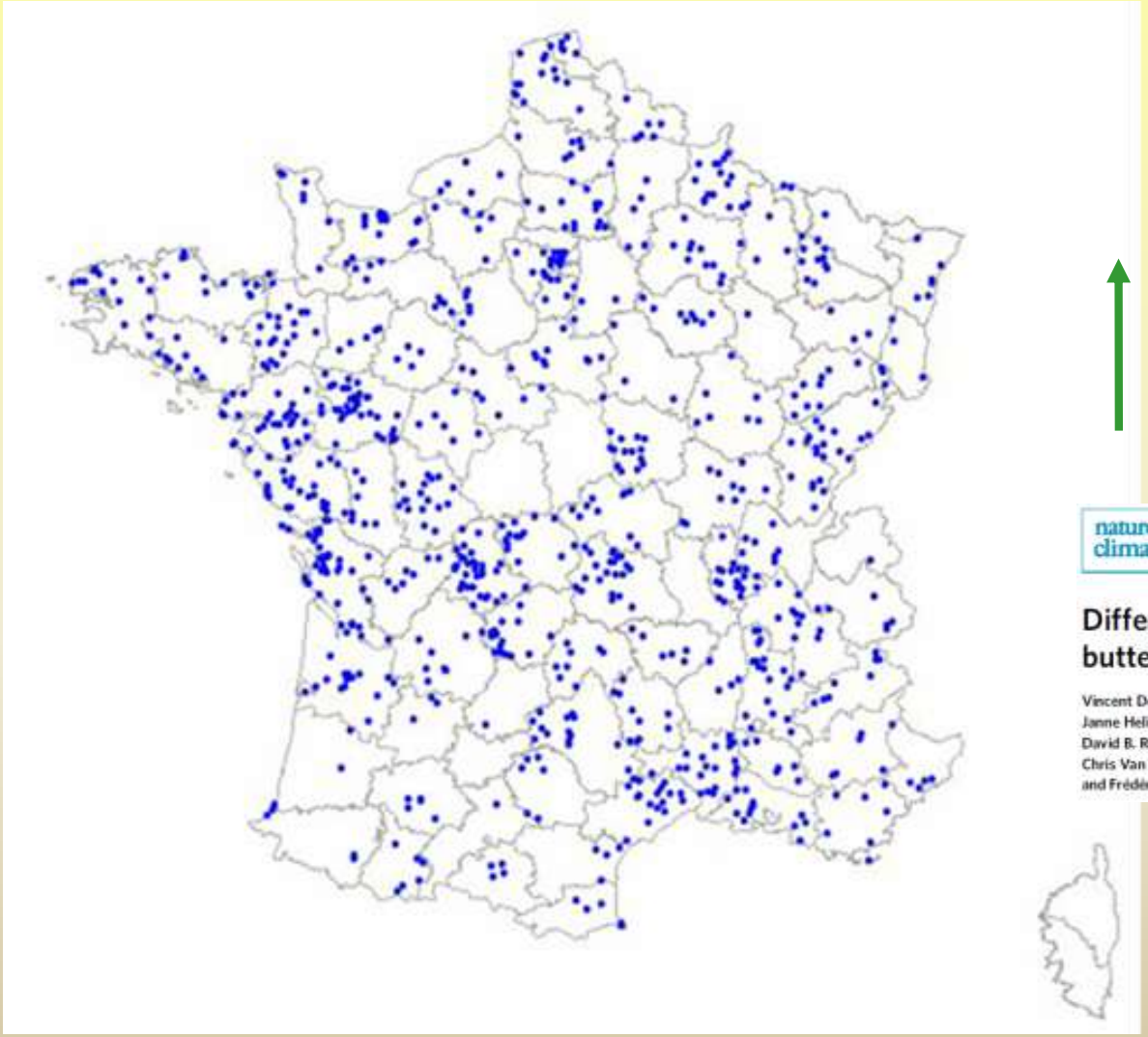




Climate change



Climate change



Communautés d'oiseaux:
90 km

nature climate change

LETTERS

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Differences in the climatic debts of birds and butterflies at a continental scale

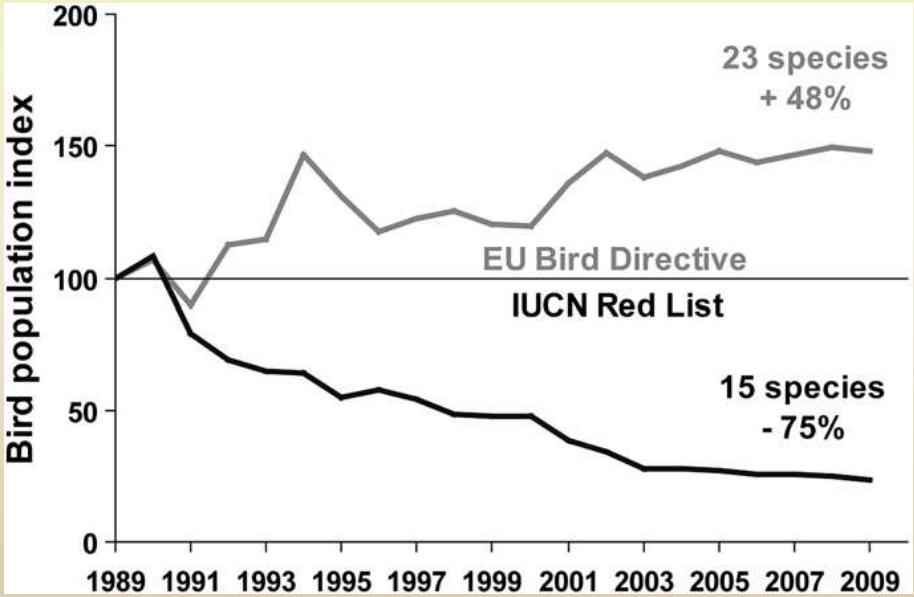
Vincent Devictor[1]*, Chris van Swaay[2], Tom Brereton[3], Lluis Brotons[4,5], Dan Chamberlain[6], Janne Heliölä[7], Sergi Herrando[4], Romain Julliard[8], Mikko Kuussaari[7], Åke Lindström[9], Jiří Reif[10], David B. Roy[11], Oliver Schweiger[12], Josef Settele[12], Constantí Stefanescu[13], Arco Van Strien[14], Chris Van Turnhout[15,16], Zdeněk Vermouzek[17], Michiel WallisDeVries[2,18], Irma Wynhoff[2] and Frédéric Jiguet[8]

(1989-2006)

Many findings of high conservation interest

2. Effects of practices and of conservation policies

Ex. : Natura 2000

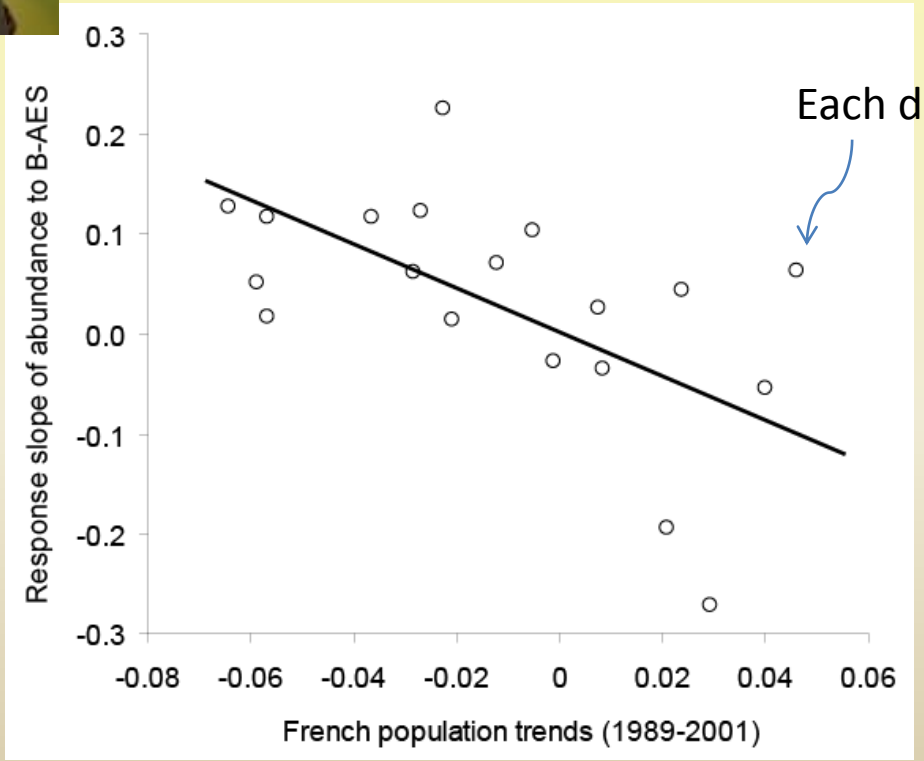


Comparison between Natura 2000 area and unprotected areas (100 commoner birds) :

-56 species + abondant, 13 species – abondant

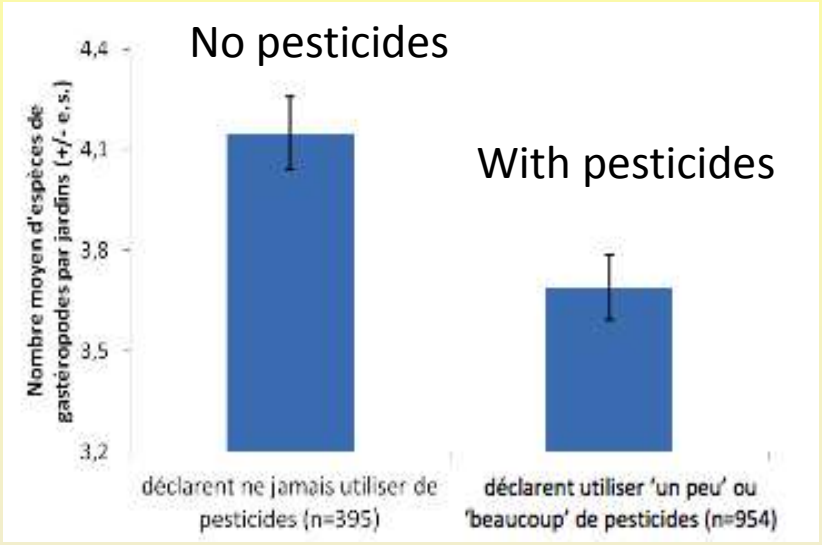
-Benefits mostly to specialised species

Positive impact of agro-environmental schemes on declining farmland species

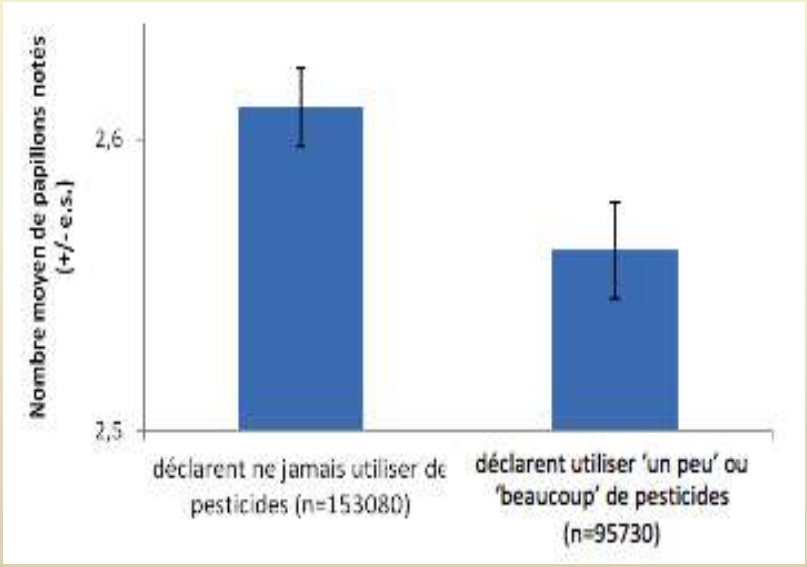


Each dot is a species

Local practices : effect of pesticid use in private gardens



Snails



Butterflies

Local practices : wildness of private gardens


-

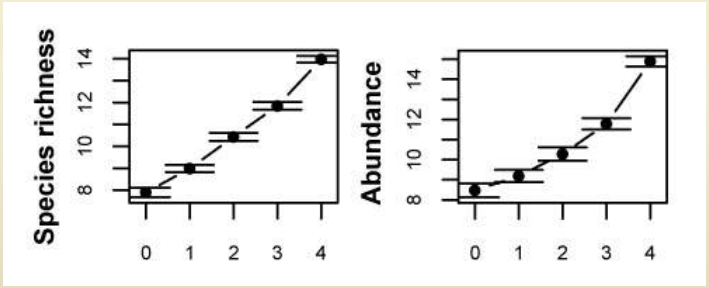
+

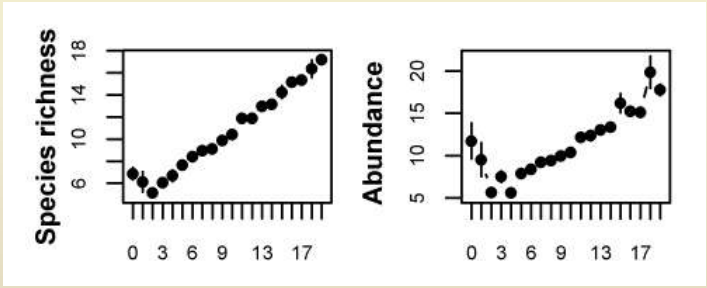
Richesse spécifique

Papillons généralistes

Papillons spécialistes



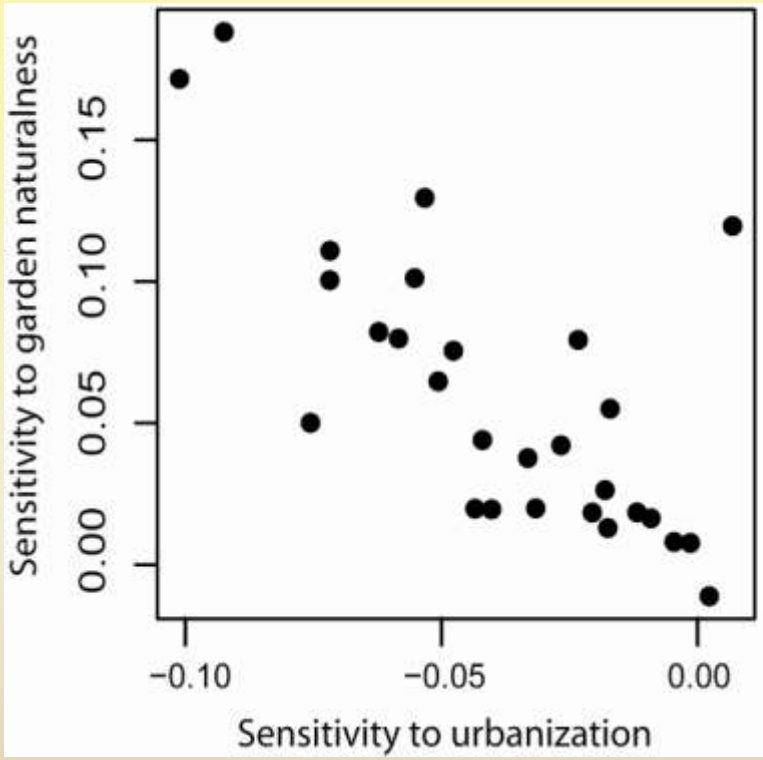


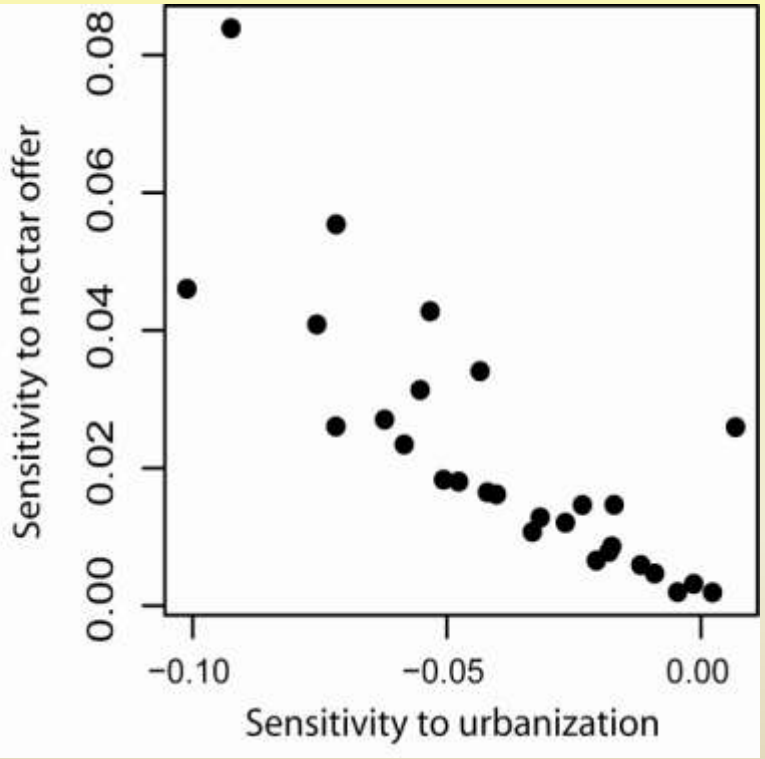


Wildness in gardens

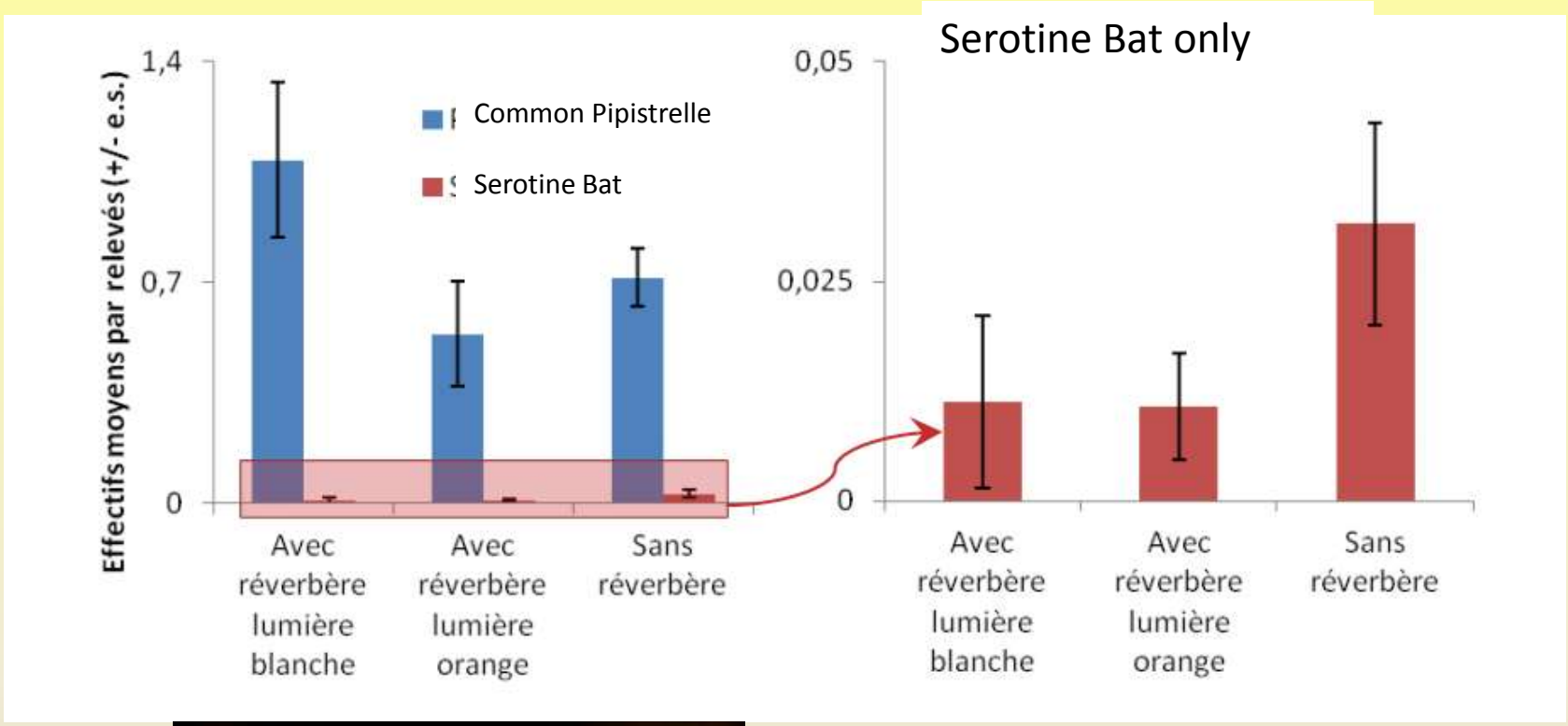
Nectar offer

The butterflies species the more sensitive to urbanization benefits the most to increased wilderness and nectar offer



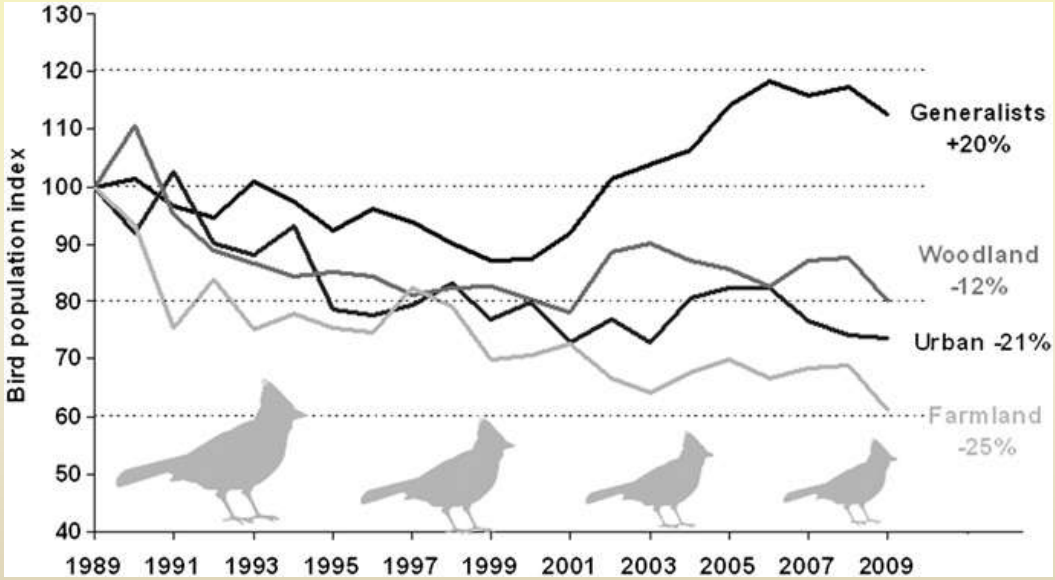


Streetlights and Bat abondance

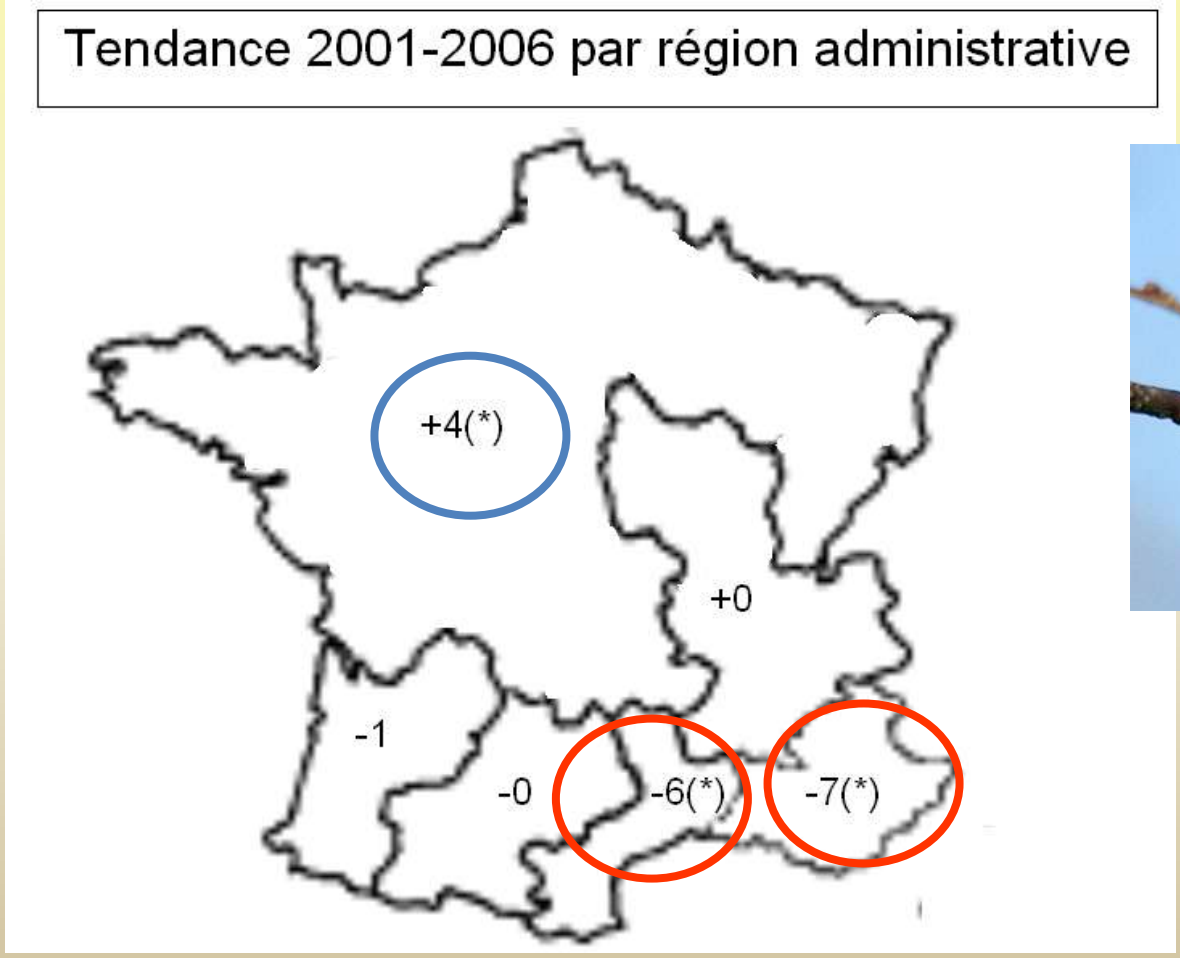


Many findings of high conservation interest

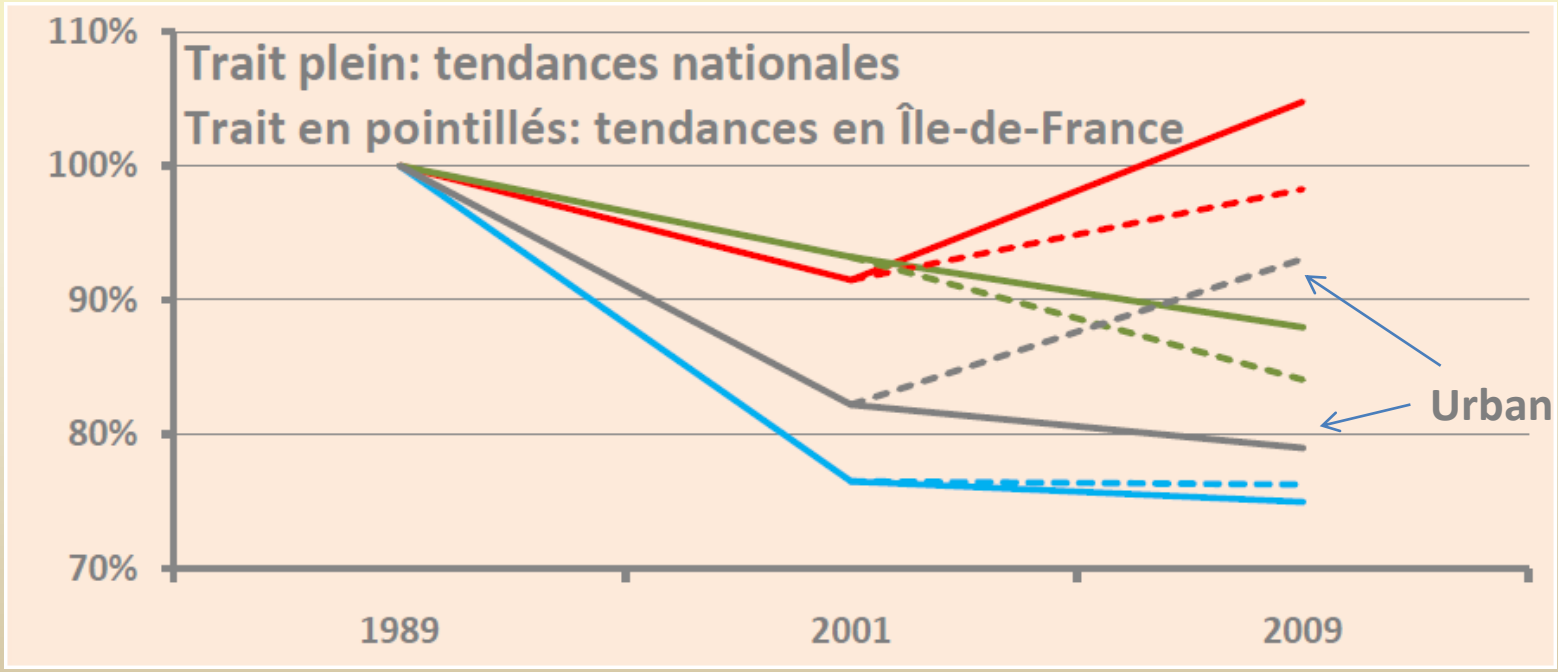
3. Biodiversity observatories at national and regional scales



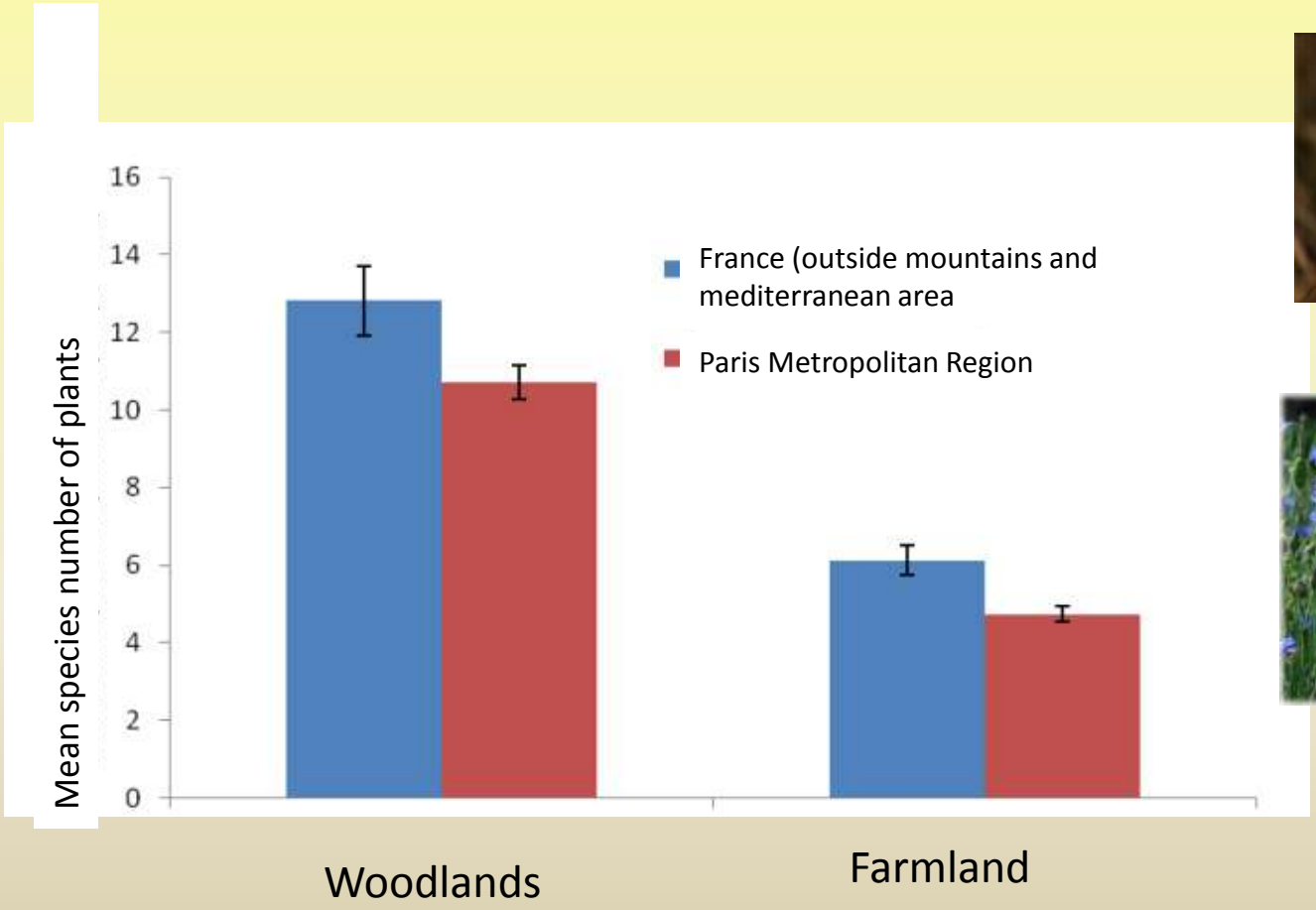
A species stable at the national level can be decreasing in some regions



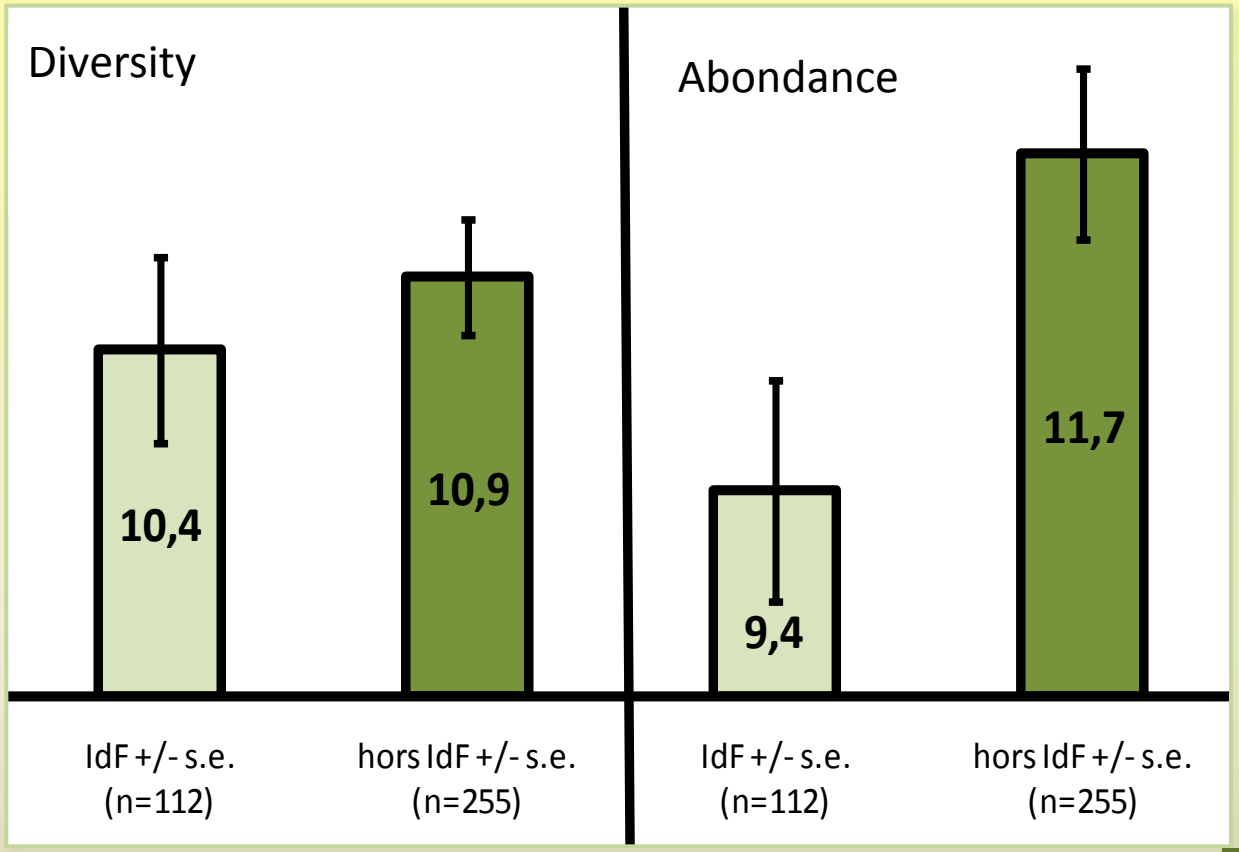
Paris Metropilitan Region Indicators



Paris Metropilitan Region Indicators

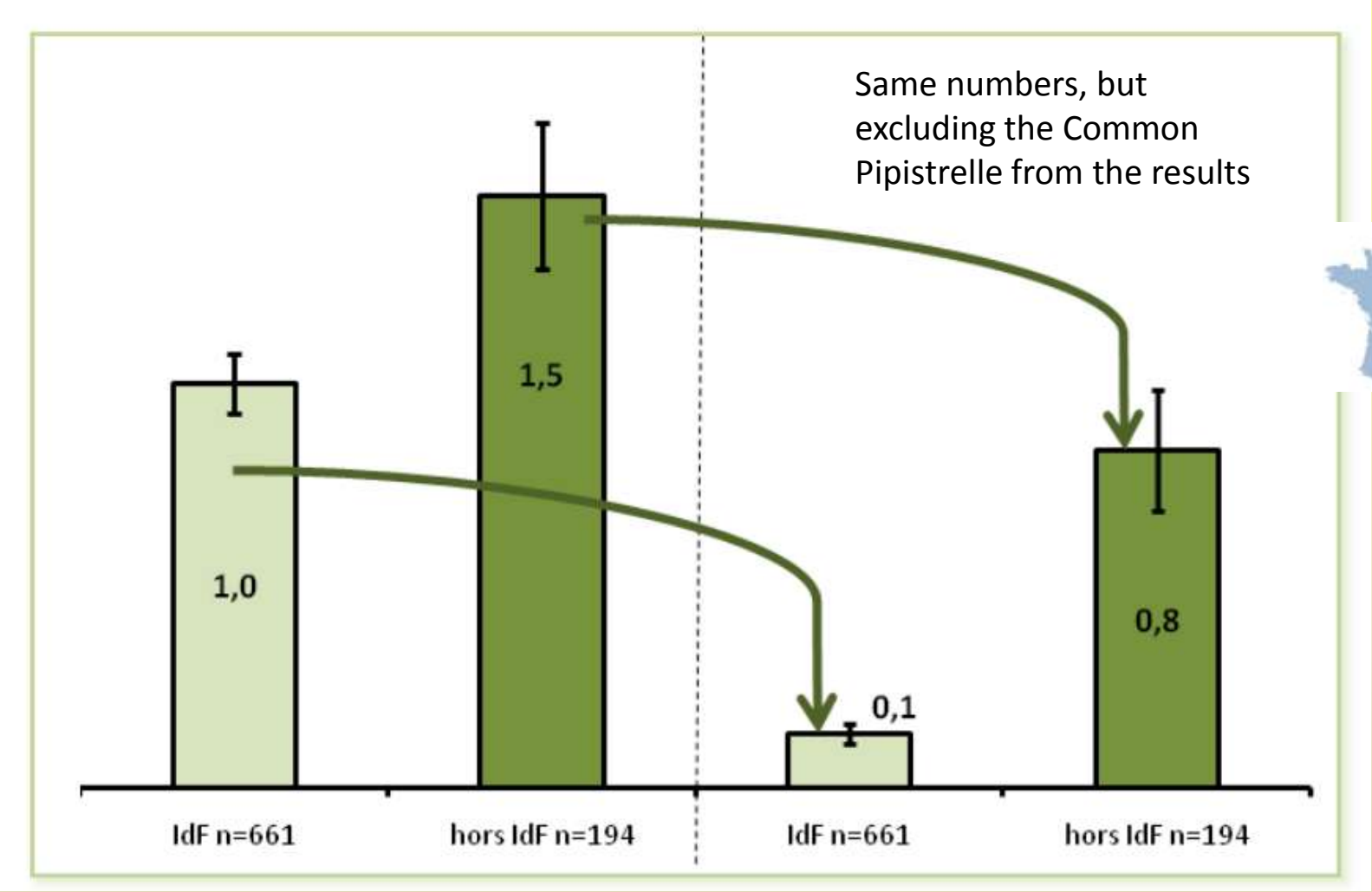


Paris Metropilitan Region Indicators



Diversity and abondance of Butterflies in Rural areas (< 20 % urbanized). Comparison with adjacent departments.

Paris Metropilitan Region Indicators



Bat abondance in forests

Developing indicators for European birds

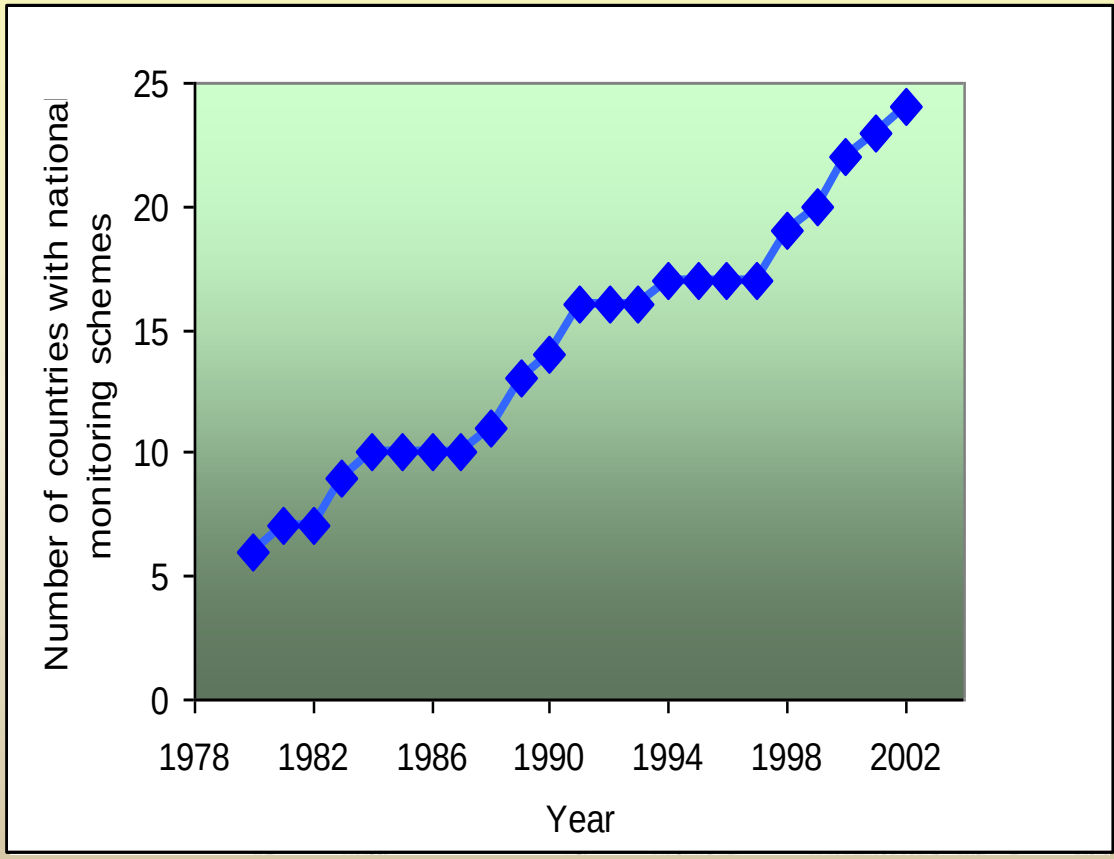
EBCC
European Bird Census Council

RSPB

- Annual index for 24 bird species associated with farmland

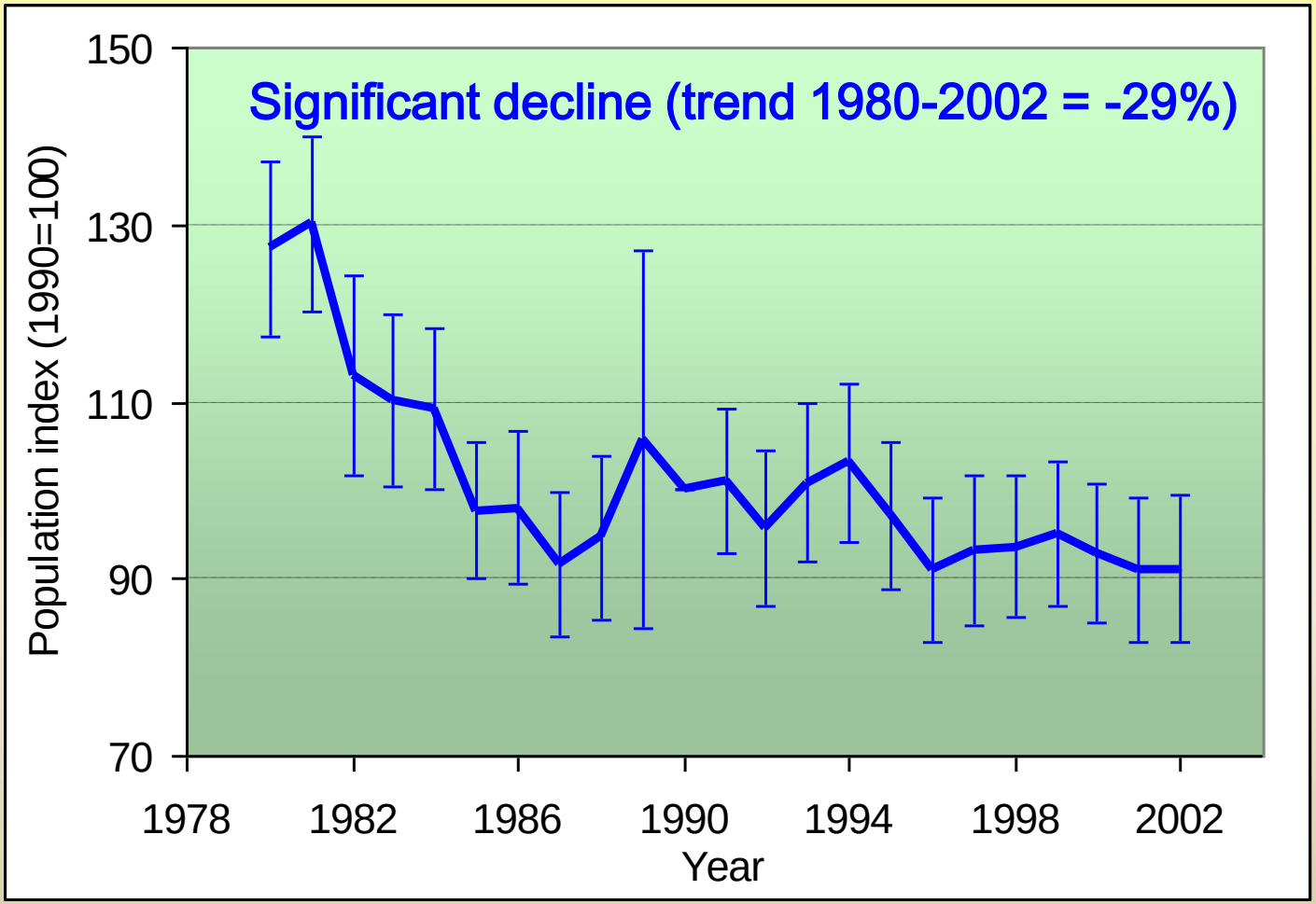
- Annual index for 24 bird species associated with woodland, parks and gardens

- Data collected from 18 countries:



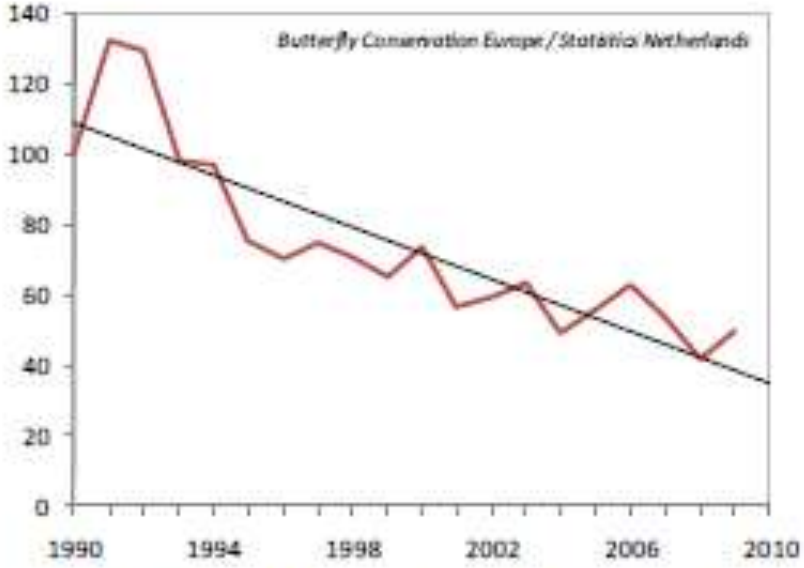
Indicator of farmland birds in Europe

(spp=23:+/- 95% CLs)



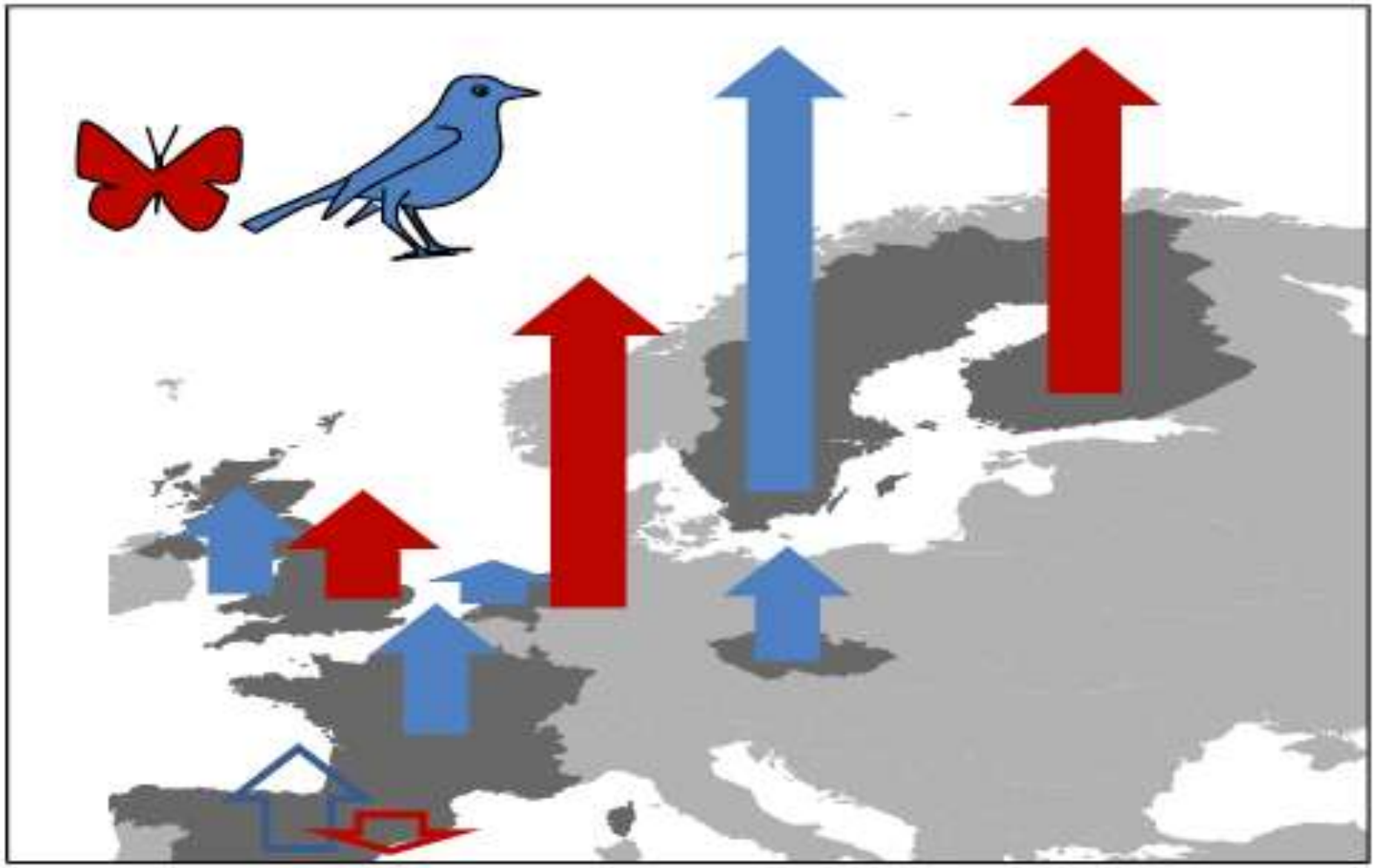
Gregory et al. *Phil. Trans. R. Soc. Lond.* B. (in press).

The European Grassland Butterfly Indicator

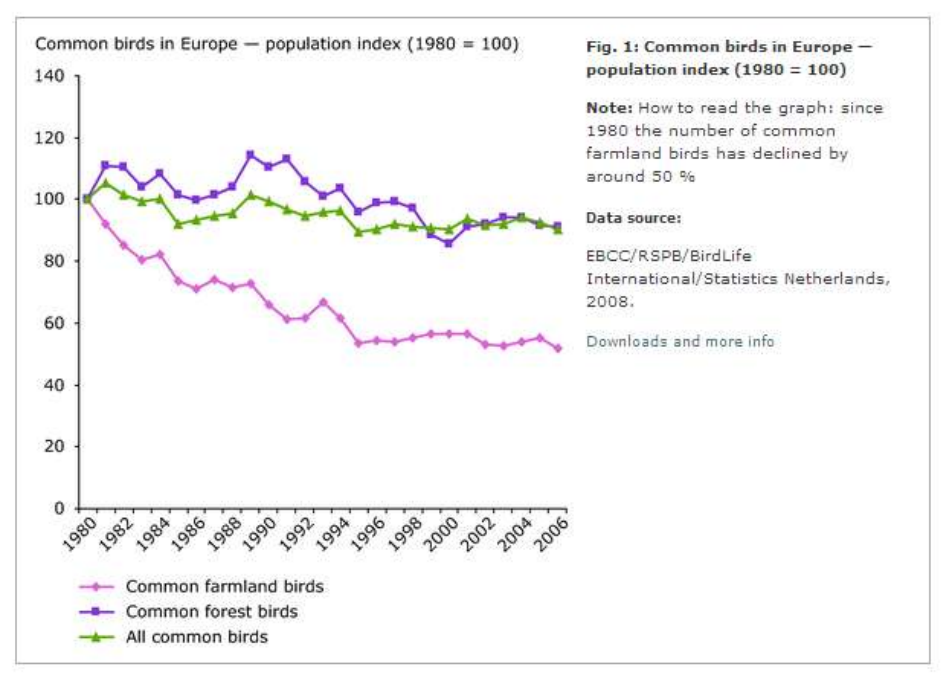


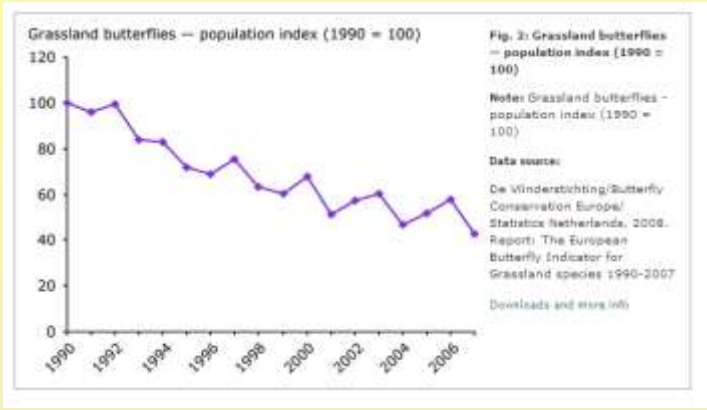
The European Grassland Butterfly Indicator *shows a dramatic decline of almost 70%.*

Northwards shifts of birds and butterflies communities



The need for extension : global biodiversity outlook 4?





Another tool for Evaluating Urban Biodiversity Policies ?

Participate to Education to Environment and Practices Changes

1st Aichi Biodiversity Target

FUTURE