

AEET & MEDECOS Conference, 1-3 February, Seville

S.07. Ecosystem functioning and services: challenges and risks in a changing world

Taxonomic and functional diversity of ants in vegetable gardens under different management regimes: agroecological vs. conventional

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Navegando el continuum rural-urbano desde una perspectiva socio-ecológica



UNIVERSITY OF
COPENHAGEN



Funded by: Andalucía Talent Hub program

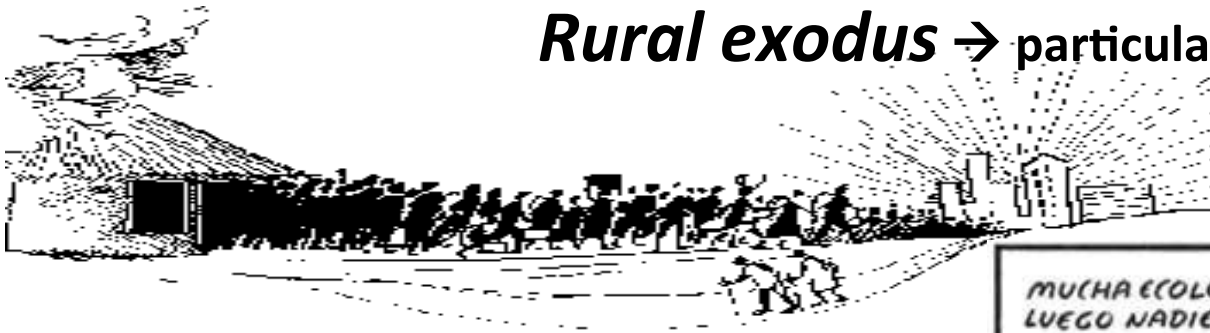


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Context of the research

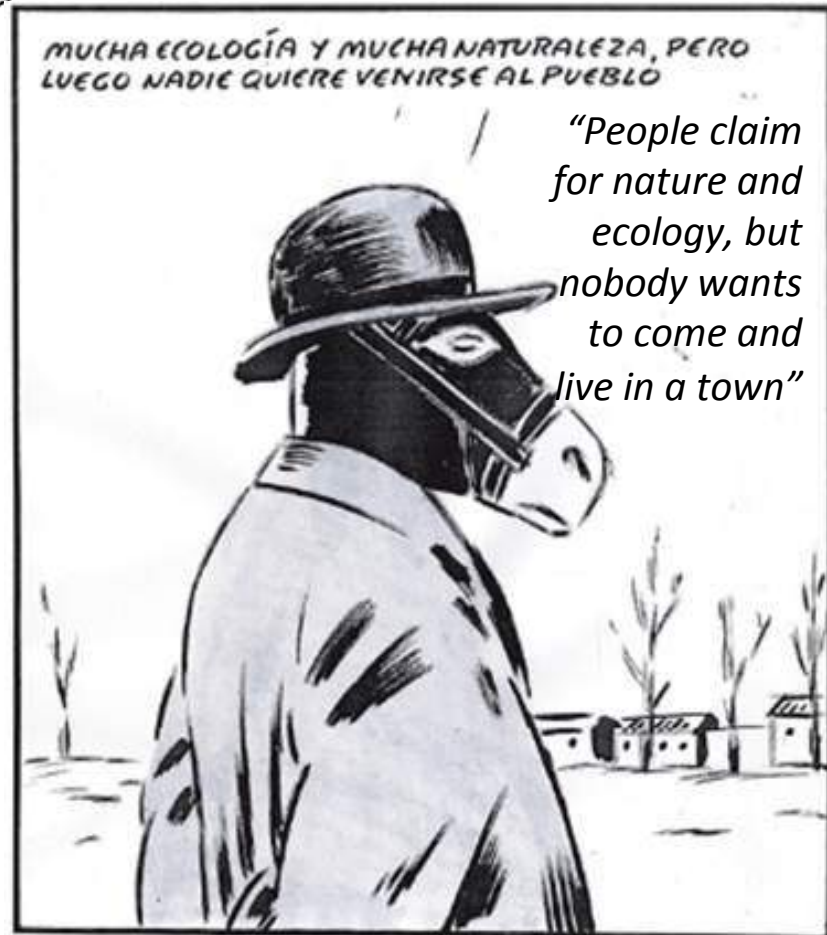
Rural exodus → particularly in mountain areas



"This is such a wonderful place...
that I can't figure how can people
live here all year round"



MUCHA ECOLOGÍA Y MUCHA NATURALEZA, PERO
LUEGO NADIE QUIERE VENIRSE AL PUEBLO



"People claim
for nature and
ecology, but
nobody wants
to come and
live in a town"

Context of the research

With the last crisis (but not only) → **back to the countryside – new peasantries**

NEORRURALES

EL CAMPO TAMBIÉN ES “COOL”

La agricultura y la ganadería no son las únicas opciones para ganarse la vida en los pueblos. Los negocios creativos también tienen cabida. Solo hay que tener la idea y el valor de llevarla a cabo. POR BEATRIZ GONZÁLEZ / FOTOS: FABIÓ ALMÁNZA

REVERDEA

Confesiones de los neorrurales

Xavi, por amor. Clara, por ganas de vivir en la naturaleza. Itziar, porque por fin las piezas del puzzle encajaban. Ángel y Mari Mar necesitaban un cambio de vida. Eva, porque siempre fue de pueblo, la ciudad no va con ella. Son algunas de las razones que han empujado a mucha gente a irse al campo...

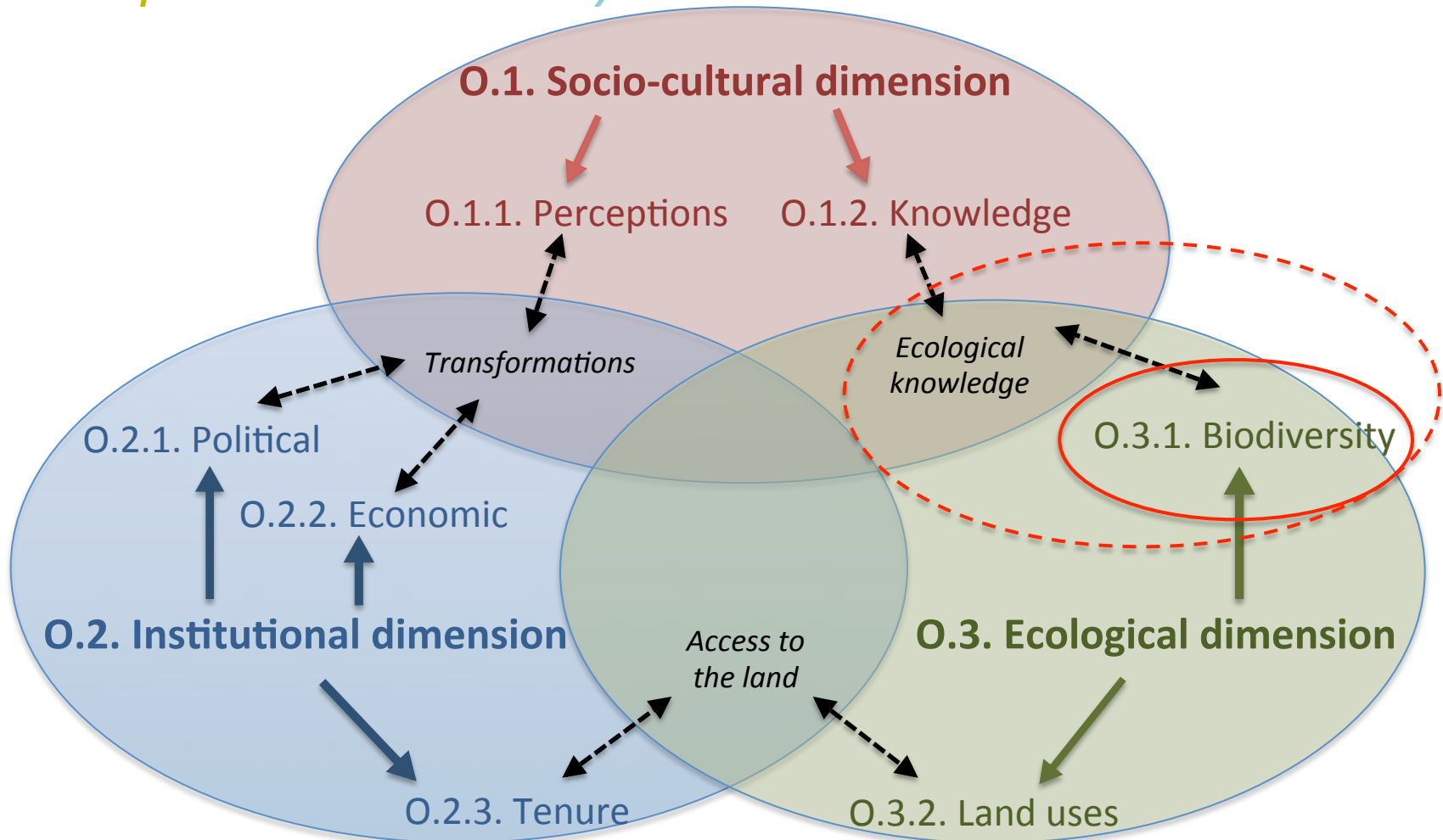
13 - 24/02/2015 - 07:15A | Última actualización: 20/06/2015 - 17:20h



Context of the research

REVERDEA *general objective*

To explore, through a social-ecological systems approach, the role of **new emergent peasantries** in **sustainability and resilience** in the rural-urban continuum.



Rationale

Transformation of agriculture
→ **Green Revolution** →
increased used of synthetic
fertilisers and pesticides

Agroecology as a counter-paradigm →
linking farming production to biodiversity
and ecological functioning as well to
socially equitable and **hard social-
ecological sustainability** principles

Ants as:

- Good indicators of changes in ecosystems
- Widely extended
- Moderately diverse
- Functionally significant
- Easy to sample
- Large influence in cultivated plants



Small-scale farming - **homegardens** →
particular social-ecological role

Biodiversity

associated

cultivated

- Important for ecosystem functioning
- Plague control
 - Nutrient recycling
 - Pollination

Aims

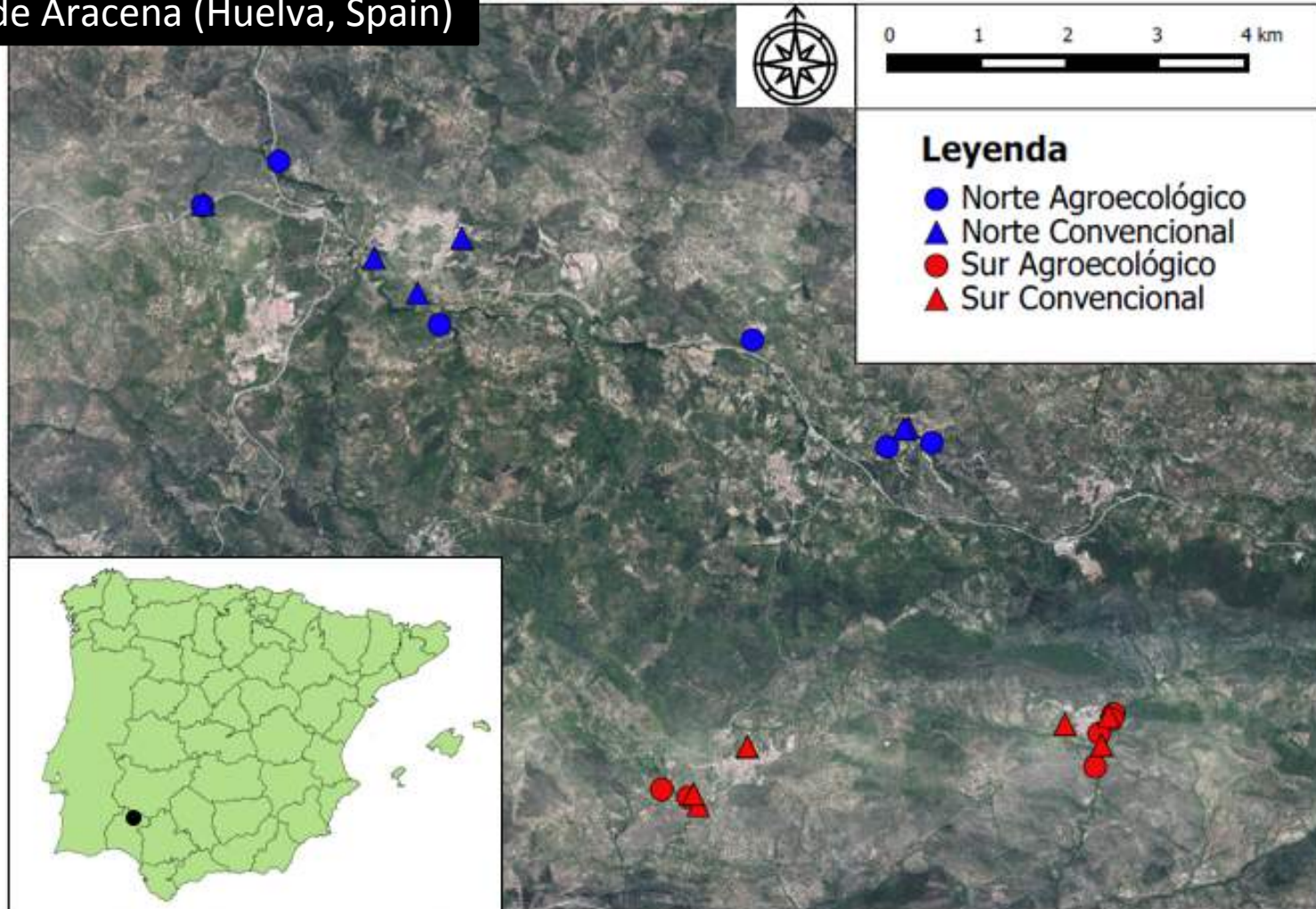
To evaluate the effect of two types of management (agroecological and conventional) of homegardens on taxonomic and functional diversity of ants, in two areas of the Sierra de Aracena (Huelva).

In particular:

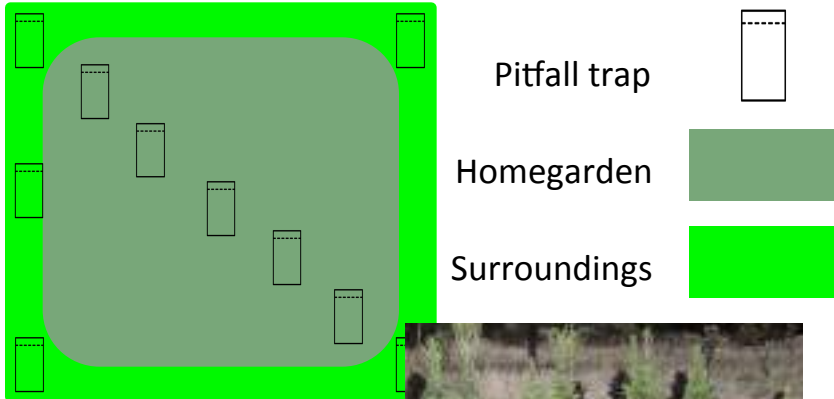
- To explore the **taxonomic diversity** of ants through **richness, diversity and species composition** in both types of management and valley, inside and in the homegarden surroundings;
- To explore ants' **functional diversity** through **five functional traits** in both types of management and valley, inside and in the homegarden surroundings.

Study area

Sierra de Arcena (Huelva, Spain)



Methods: sampling & identification



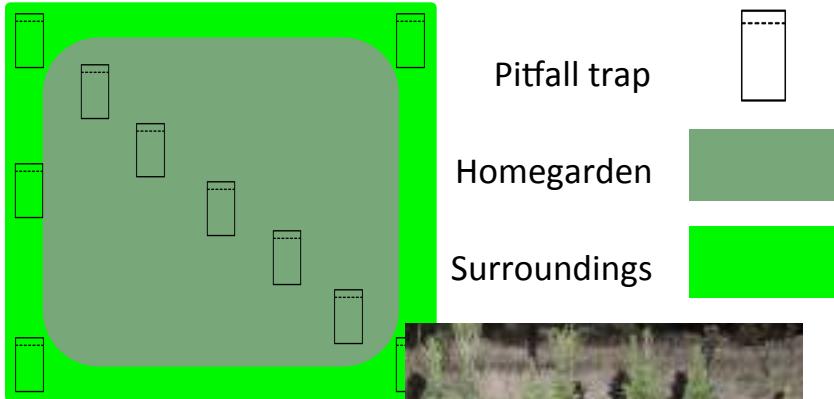
- **10** pitfall traps in each homegarden ($N=5$) and its surroundings ($N=5$);
 - **2** valleys (S-N);
 - **2** management regimes (A-C);
 - **12** homegardens per valley:
- total $N = 240$ pitfall traps



[YouTube: "Hormigas en las huertas"](#)



Methods: sampling & identification



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→ total $N = 240$ pitfall traps

Identification of ant species

Measurement of functional traits



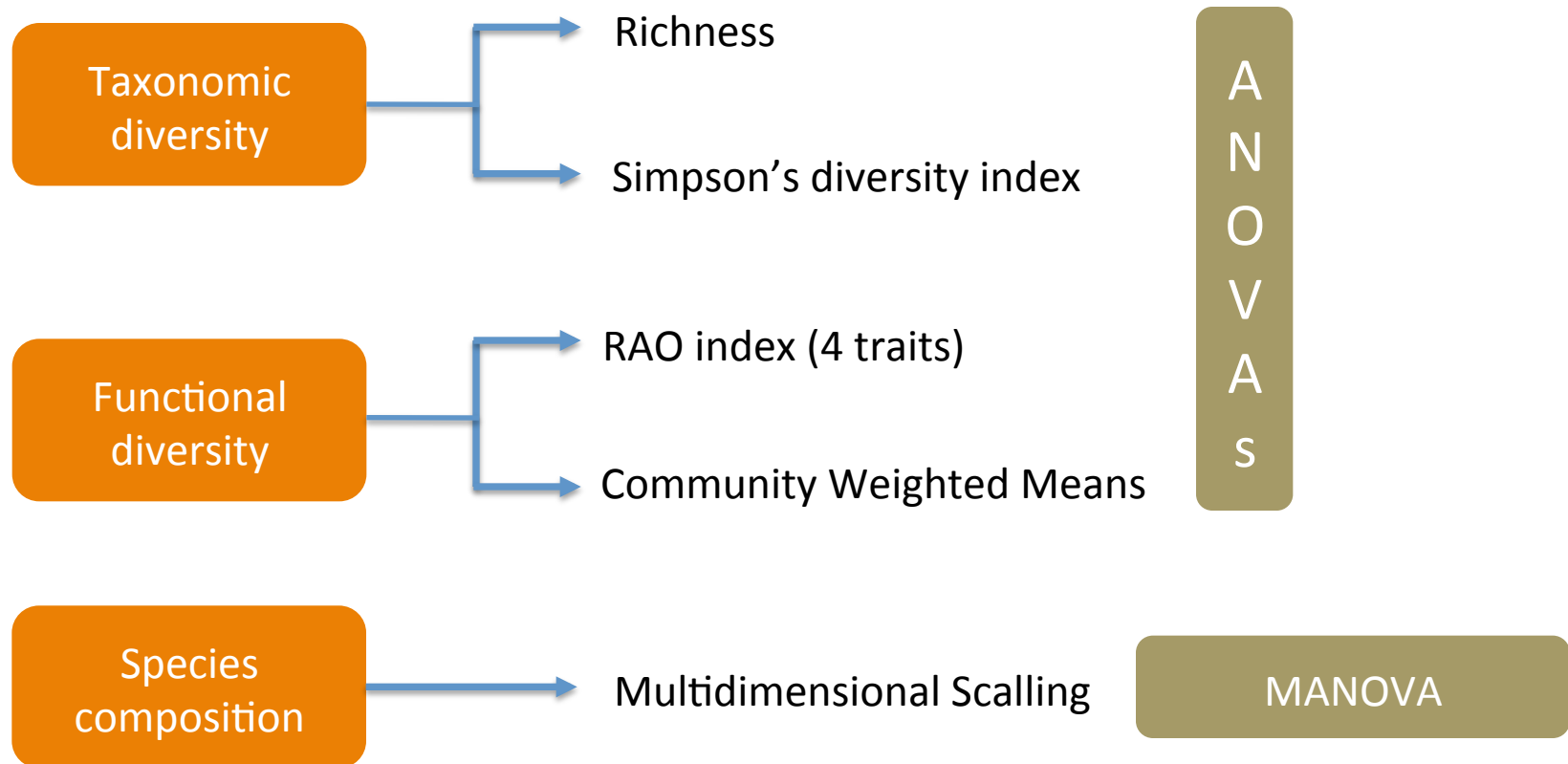
[YouTube: "Hormigas en las huertas"](#)



[YouTube: "Hormigas en el laboratorio"](#)

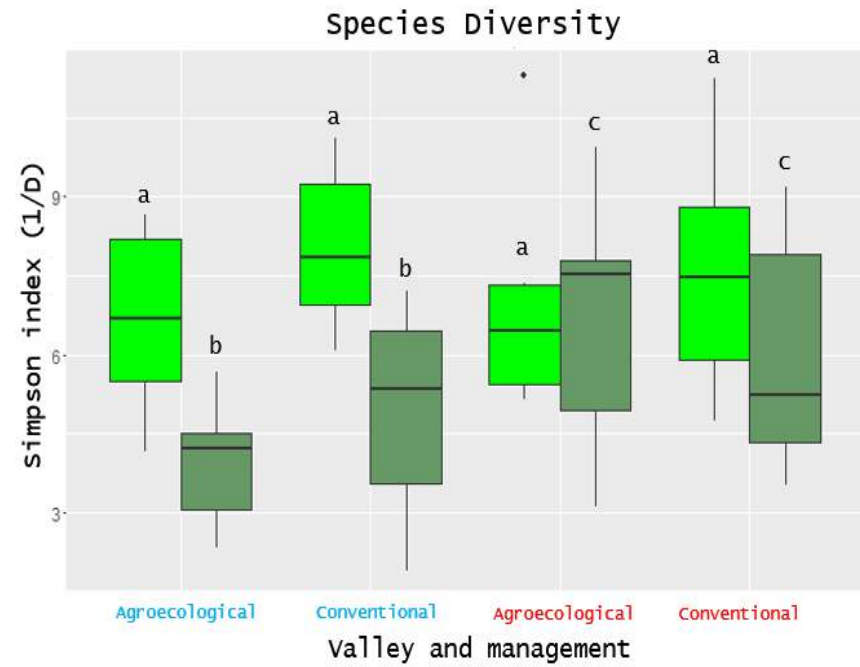
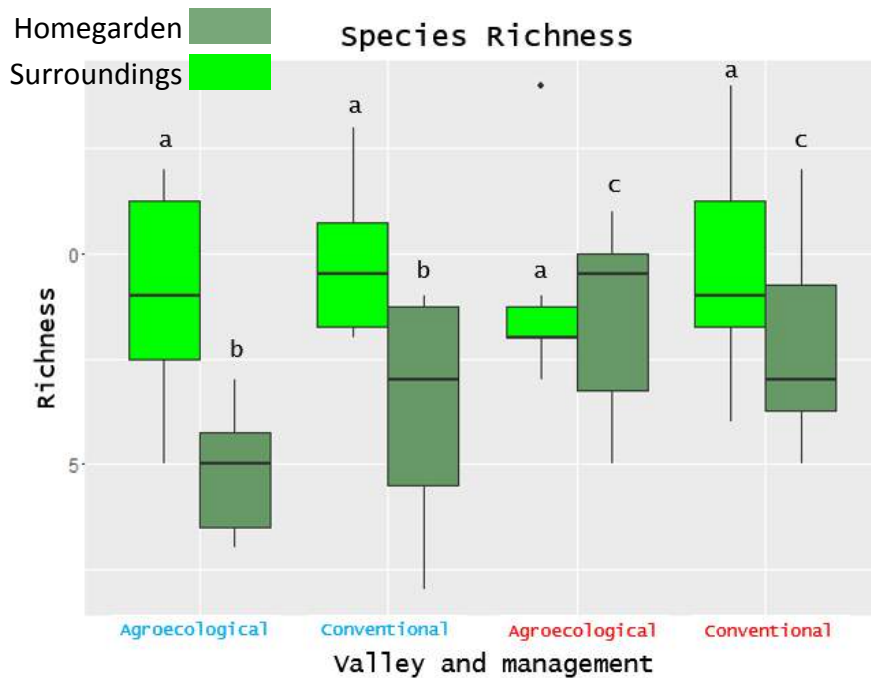


Methods: variables and data analysis



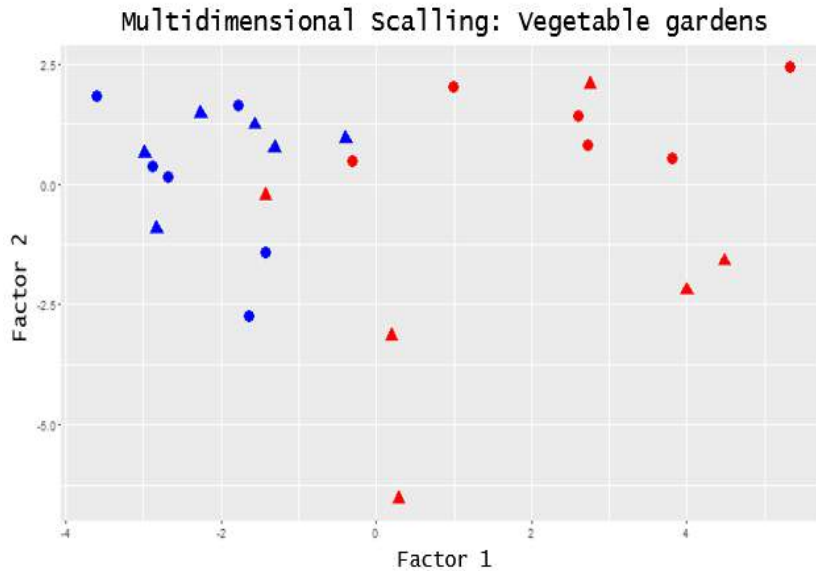
Data analysis: “stats”, “vegan” and “ggplot2” packages in R (R Core Team, 2016) and Excel

Results & discussion: taxonomic diversity



- **No effect of the management regime:** horticulture tradition in the area, flow of workers from the surroundings;
- **Greater taxonomic diversity in the surroundings:** more spatial heterogeneity than the homegardens;
- **No differences between valleys:** the structural complexity of the surroundings.

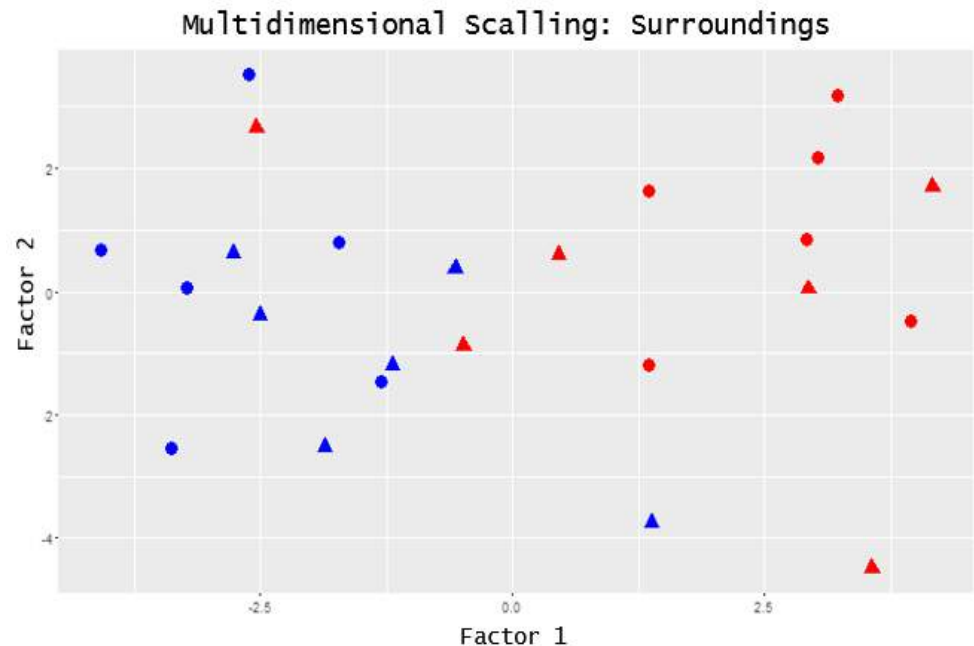
Results & discussion: species composition



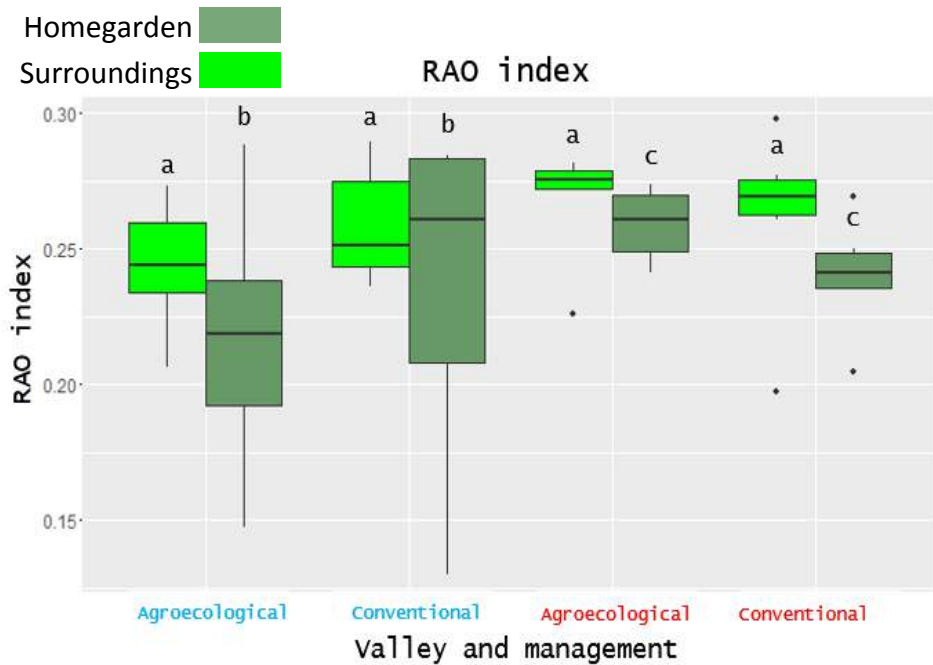
▲ Conventional
● Agroecological

- **Both inside and outside: no influence of management;**
- Within homegardens: different species composition between **valleys** → interaction of management and valley;
- In the surroundings: different species composition between valleys

Species composition is affected by spatial heterogeneity.

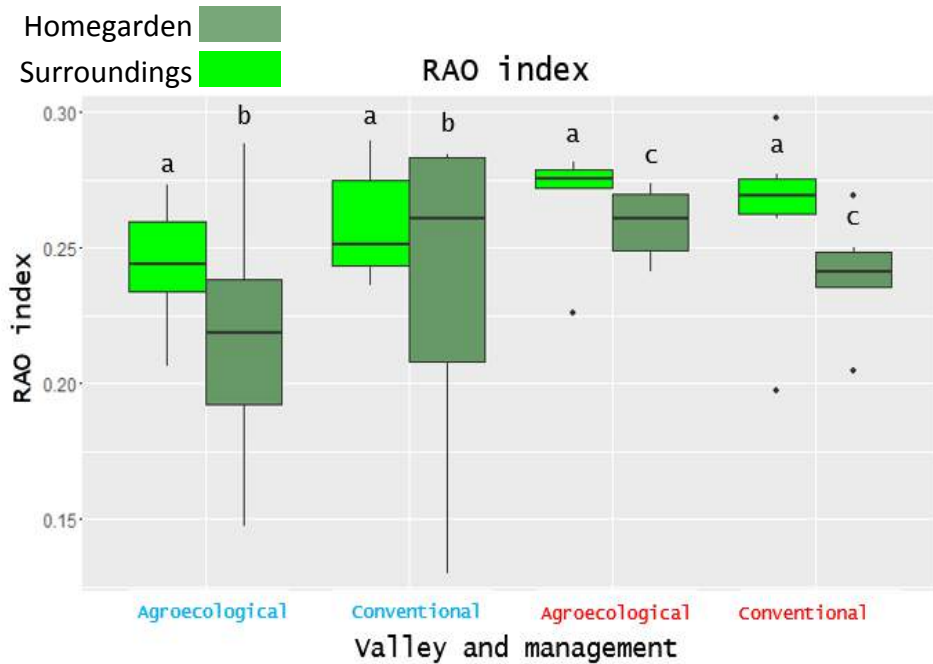


Results & discussion: functional diversity



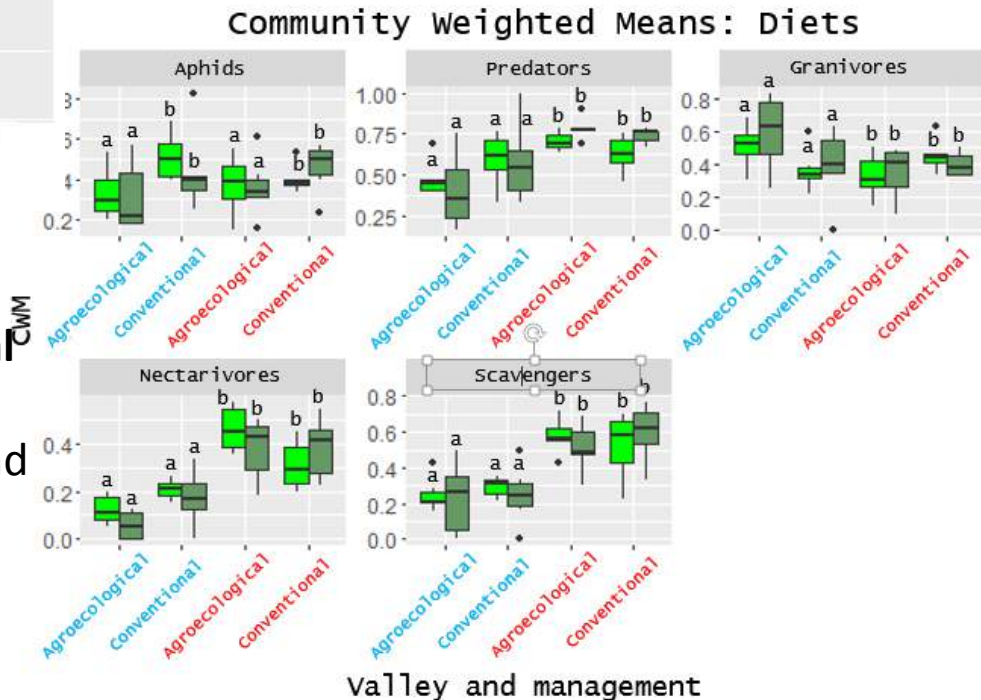
- **More functional diversity in the surroundings than inside** → trees;
- Inside: no influence of management but differences between valleys

Results & discussion: functional diversity

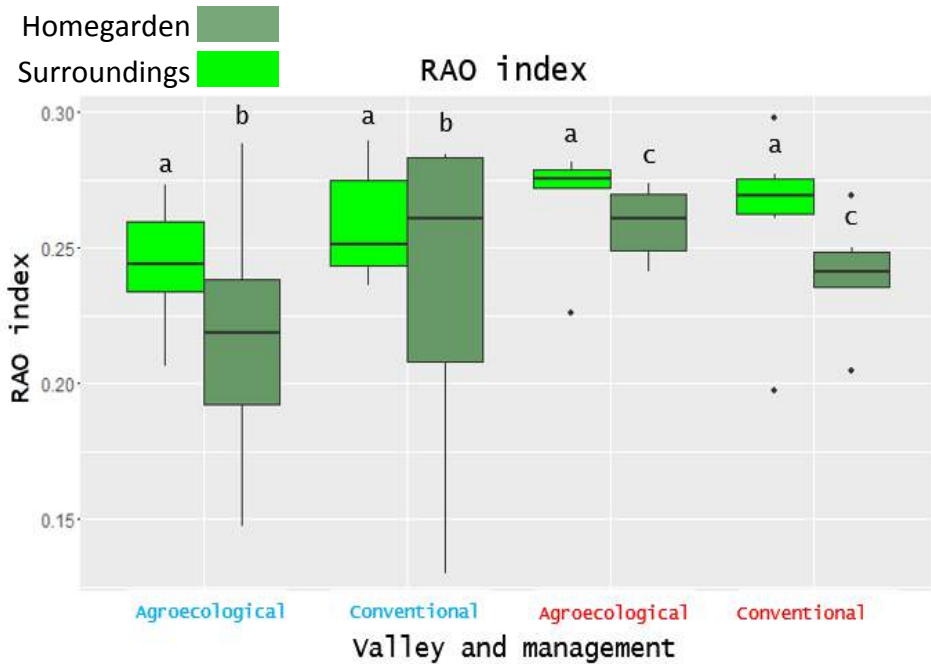


- **More functional diversity in the surroundings than inside** → trees;
- Inside: no influence of management but differences between valleys

- **No difference in diets between inside/outside** → heterogeneous context
- **More aphid-related feeding in conventional** management ;
- Southern valley: predation, nectarivory and scavenging;
- Northern valley: granivory

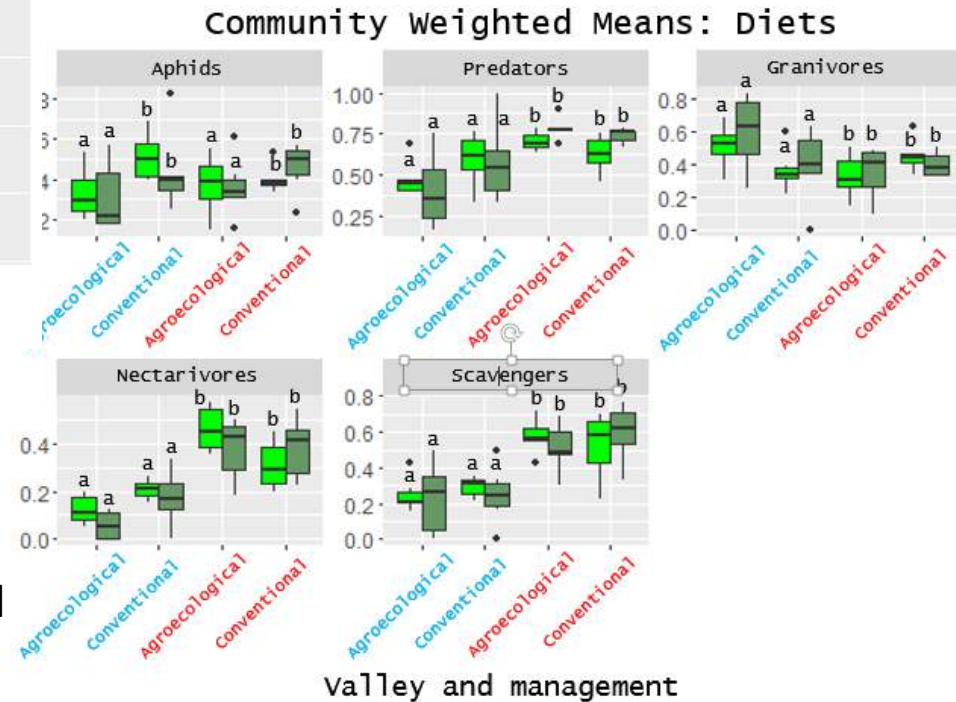


Results & discussion: functional diversity



- **More functional diversity in the surroundings than inside** → trees;
- Inside: no influence of management but differences between valleys

- **No difference in diets between inside/outside** → heterogeneous context
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**Barely any effect of management but this depends on the valley:
Differences in management? Important effect of the environment?**