

Sophie Joimel

PATTERNS OF SOIL BIODIVERSITY COMMUNITIES IN URBAN MICROFARM

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GLOBAL SYMPOSIUM ON SOIL BIODIVERSITY | 19-22 April 2021

Recent research project on urban agriculture biodiversity

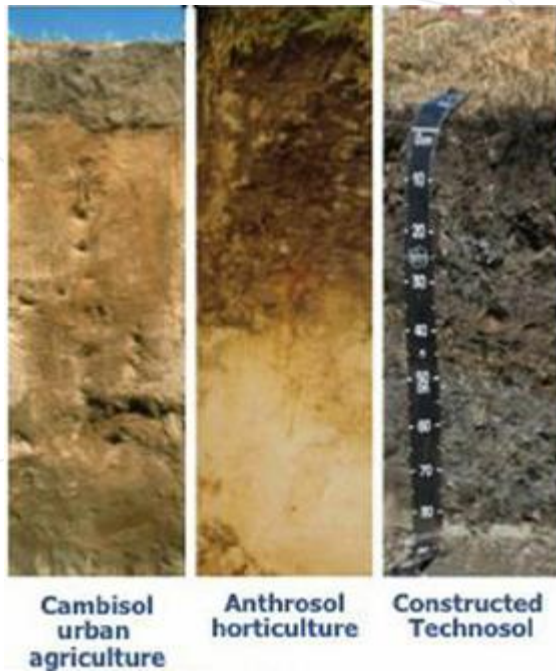
- JASSUR (2012-2016)
 - **Urban vegetable gardens**
- TROL (2016-2018)
 - **Cultivated green roofs**
- SEMOIRS (2018-2020)
 - **Urban microfarming**
- Experimental cultivated green roof
 - Since 2012



Soil : support of ecosystems services provided by urban agriculture

Diversity of urban agriculture soils

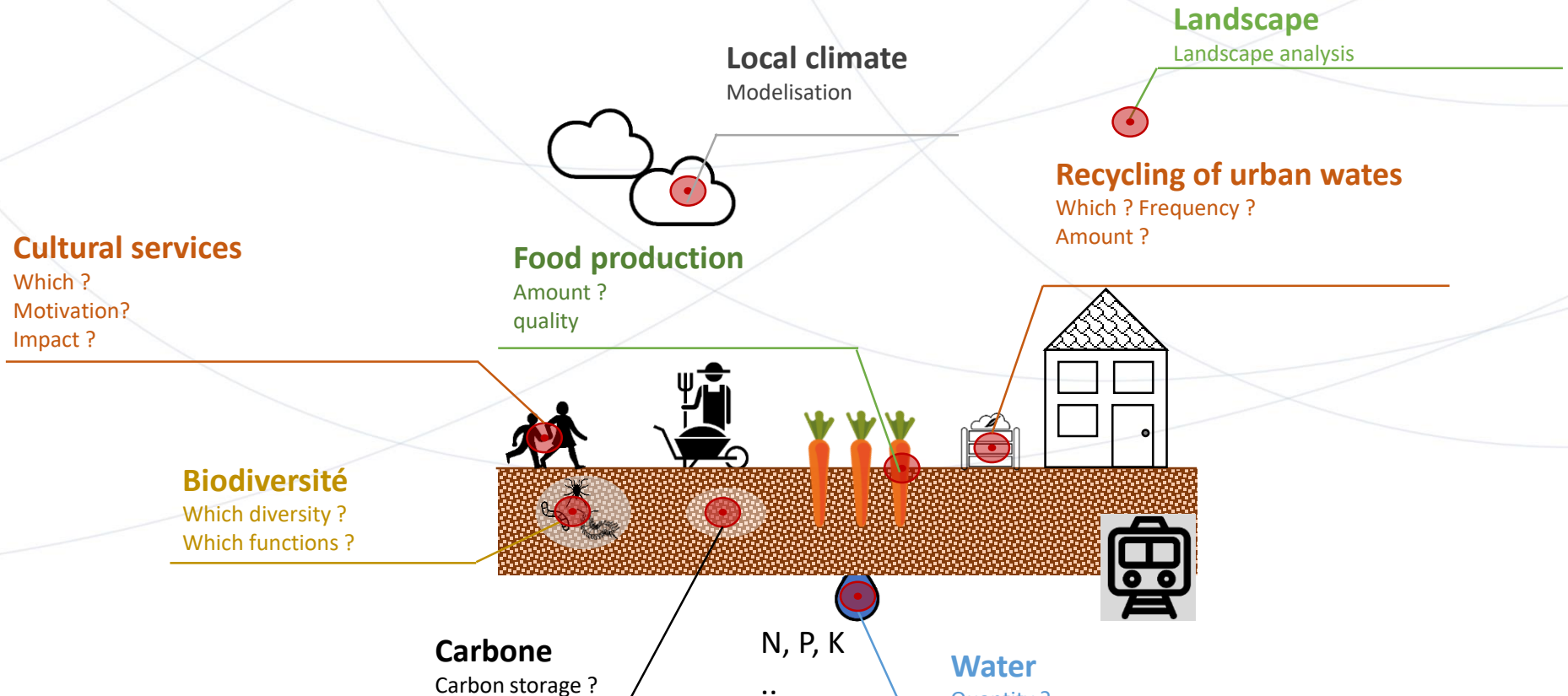
Morel et al. 2014



- Soil health and biodiversity support



SEMOIRS project : Methodology of ES evaluation in urban micro-farm



(Grard et al. 2020)

Ecosystem services provided to farmer or society

Benefits



Food
production

Benefits



Multifunctionality
Environmental quality



Illustrative studies sites

7 urban microfarms

- **3 sites in greens roofs**
- Constructed soil
- 2012 à 2016
- Total area : 145 to 900 m²
- Cultivated area : 80 to 400 m²
- 1 experimental microfarm

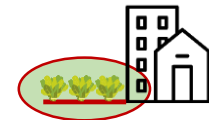


Illustrative studies sites



7 urban microfarms

- **4 sites at baseground soil**
- Pseudo-natural soil
- 2006 to 2014
- Total area : 1 100 à 40 000 m²
- Cultivated area : 1 600 à 20 000 m²
- 1 microfarm with contaminated soil



Data collection on biodiversity

Une méthode participative



Échanges avec les cultivateurs,
carnet de récolte...

Participative

Des relevés de terrain



Prélèvements de sol
et de légumes

On the field

Des mesures en laboratoire



Analyse des
échantillons

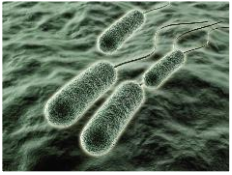
In laboratory

3 different methods



Bioindicators of soil quality

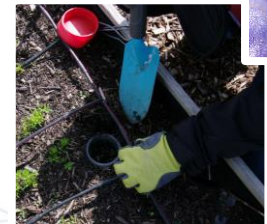
Micro-organisms



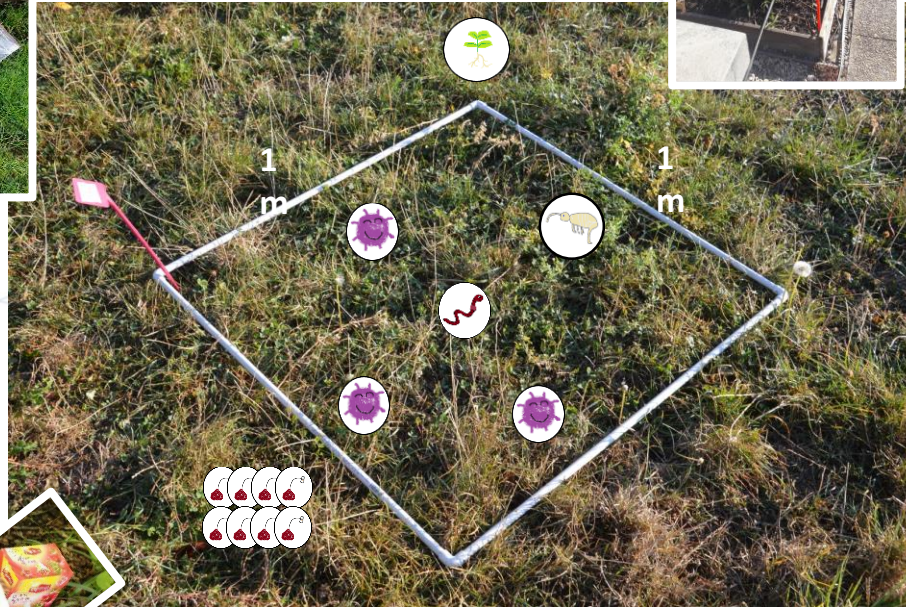
Plants



Collembola



Tea-bag index



Macrofauna



A high variability between and within sites



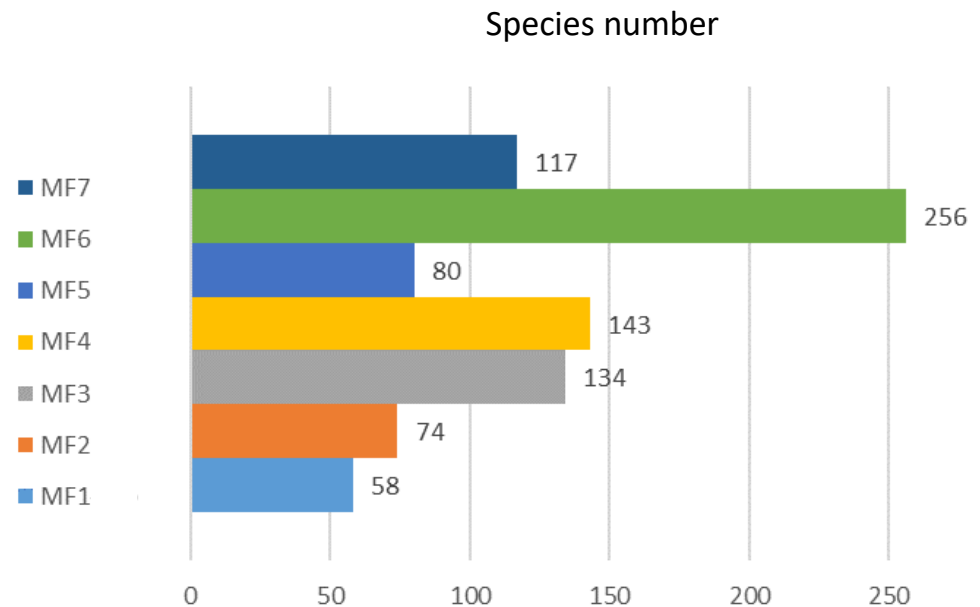
- Widespread species



Veronica persica

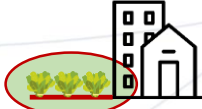


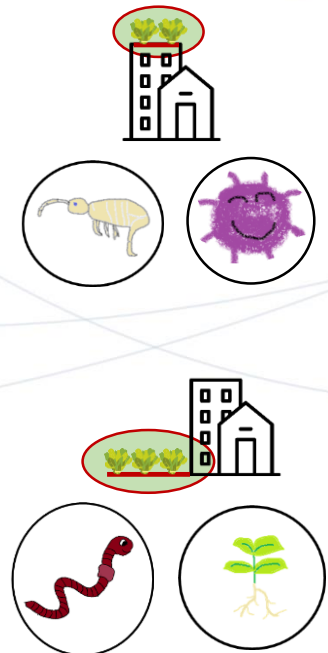
Sonchus asper



Differences related to urban microfarm types

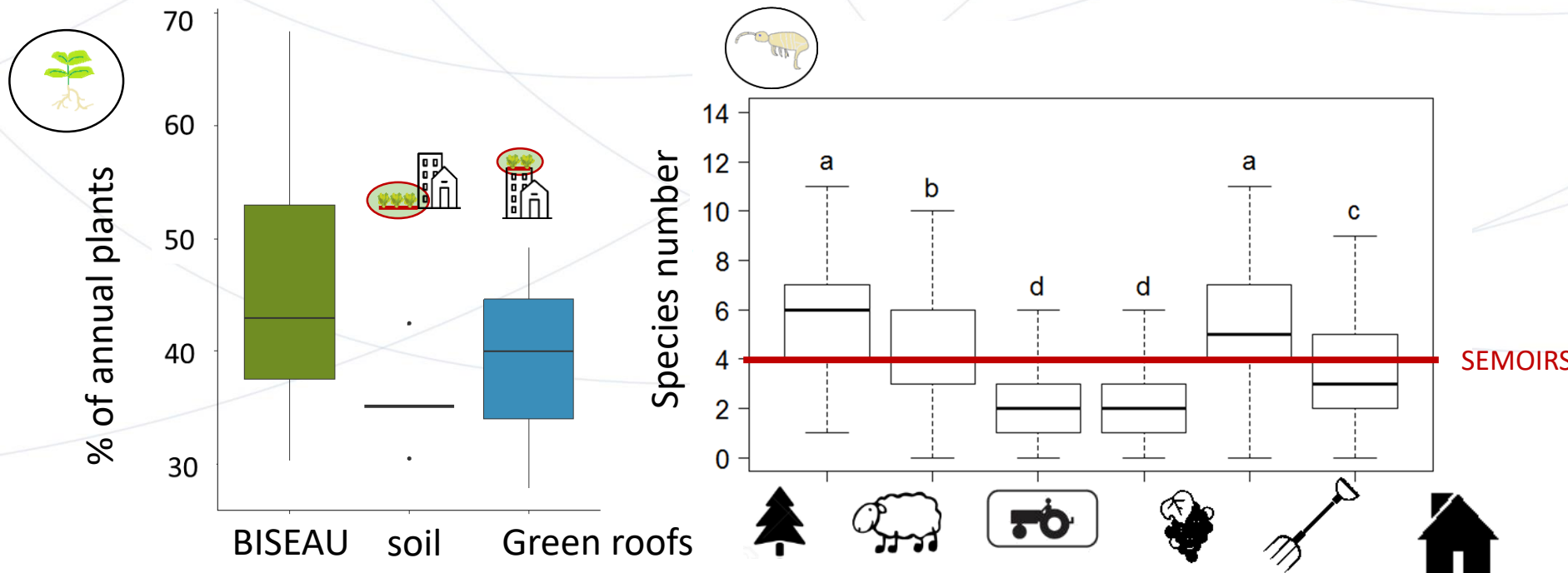
- Effect on taxonomical structure

	 Green roof	 ground
 Density (10 ³ ind.m ⁻²)	87 ± 10^a	46 ± 4 ^a
Species number	4 ± 1 ^a	4 ± 3 ^a
Abundance (nbre ind. By trap)	13 ± 17 ^a	27 ± 36^a
 Taxonomic number (family)	5 ± 2 ^b	7 ± 3^a



- Different trends un function of taxonomic groups

Compare results to reference values ?



- A lack of references in order to compare obtained values with literature

Conclusion

- Development methods adapted to the urban environment
 - Participatory science
- Lack of reference values due to the very great variability of urban soils
- Need to take into account the temporal dynamics of biodiversity, particularly in built-up areas (whose characteristics can vary rapidly in the first few years) and spatially (e.g. fragmentation of habitats)
- Urban soil biodiversity needs to be better known and understood because of its key role in the functioning of ecosystems and the associated ecosystem services
- Need for ADOs and evaluation grids for project leaders and local authorities



To go further...

Agronomy for Sustainable Development (2018) 38:2
<https://doi.org/10.1007/s13593-017-0474-2>

RESEARCH ARTICLE



Rooftop farming on urban waste provides many ecosystem services

Baptiste J.-P. Grard^{1,2} • Claire Chenu¹ • Nastaran Manouchehri³ • Sabine Houot¹ •
Nathalie Frascaria-Lacoste² • Christine Aubry⁴

Accepted: 10 November 2017
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Ecological Engineering 111 (2018) 117–124



Contents lists available at ScienceDirect

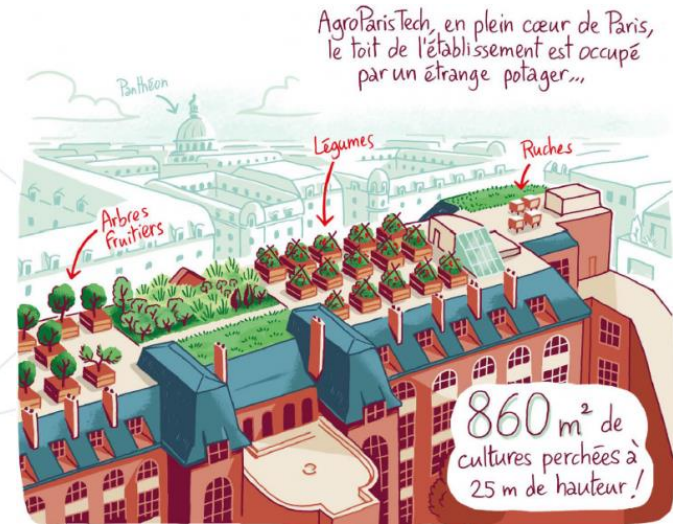
Ecological Engineering

journal homepage: www.elsevier.com/locate/ecoleng



Are Collembola “flying” onto green roofs?

Sophie Joimel^{a,*}, Baptiste Grard^{a,b}, Apolline Auclerc^{c,d}, Mickaël Hedde^{a,1}, Nolwenn Le Doaré^a,
Sandrine Salmon^e, Claire Chenu^a



Scientific articles

Grard et al. (2015) Food, Agri. and Soc.
Dorr et al. (2017) Agro. Sust. Dev.;
Grard et al. (2018) Agro. Sust. Dev
Joimel et al. (2018) Ecol. Eng.
Joimel et al. (2019) Urban Ecosyst



Broad public

THE CONVERSATION

Le Monde

Le Parisien



Télérama

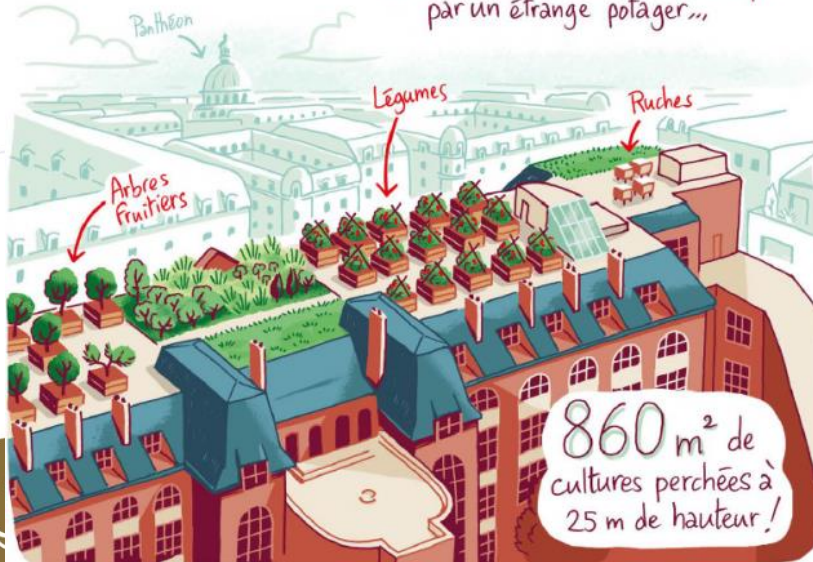
TV5MONDE

Brut.

Deutschlandfunk



AgroParisTech, en plein cœur de Paris,
le toit de l'établissement est occupé
par un étrange potager...



Project leader and local authorities



A.C Daniel



REFUGE : A. Barbillon



SEMOIRS :
B. Grard and
C. Chenu



FOOD ENERGY WATER
METER

FEW-meter : A. Lelièvre
and B. Grard

<http://www.fewmeter.org/en/home/>

Scientific articles

Grard et al. (2015) Food, Agri. and Soc.
Dorr et al. (2017) Agro. Sust. Dev.;
Grard et al. (2018) Agro. Sust. Dev
Joimel et al. (2018) Ecol. Eng.

The background is a detailed, stylized illustration of a microbial world. It features a variety of organisms including bacteria, fungi, and protozoa, rendered in white and light brown outlines against a dark brown, textured background. A single green leaf with a white stem and root is positioned at the top center, appearing to grow from the microbial landscape. The overall style is artistic and scientific.

**Thank you for
your attention**