

## Context

Earthworms contribute to the dynamics of soil organic matter by collecting, burying, and ingesting plant litter. The "earthworm basket" protocol developed by EcoBioSoil (OPVT, 2015) allows observing part of these phenomena by placing baskets of chopped straw against the ground for several months.



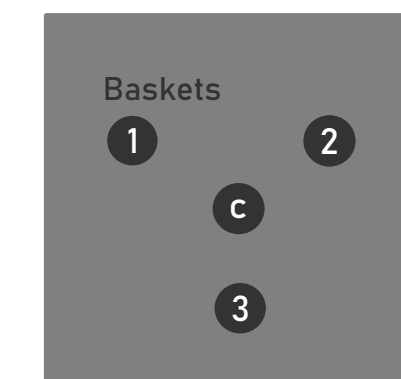
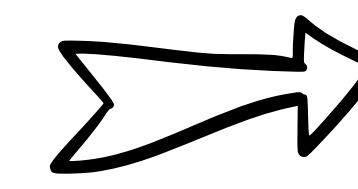
Earthworm baskets are primarily intended for **participatory research** and we did not find any published results using this method.

However, the protocol seems interesting for identifying farming techniques that enhance earthworm activity. We included earthworm baskets in a broader on-farm study about ecosystem services to evaluate its suitability as a research tool.

## Methodological outcomes

① The results variability was greater between than within crop fields.

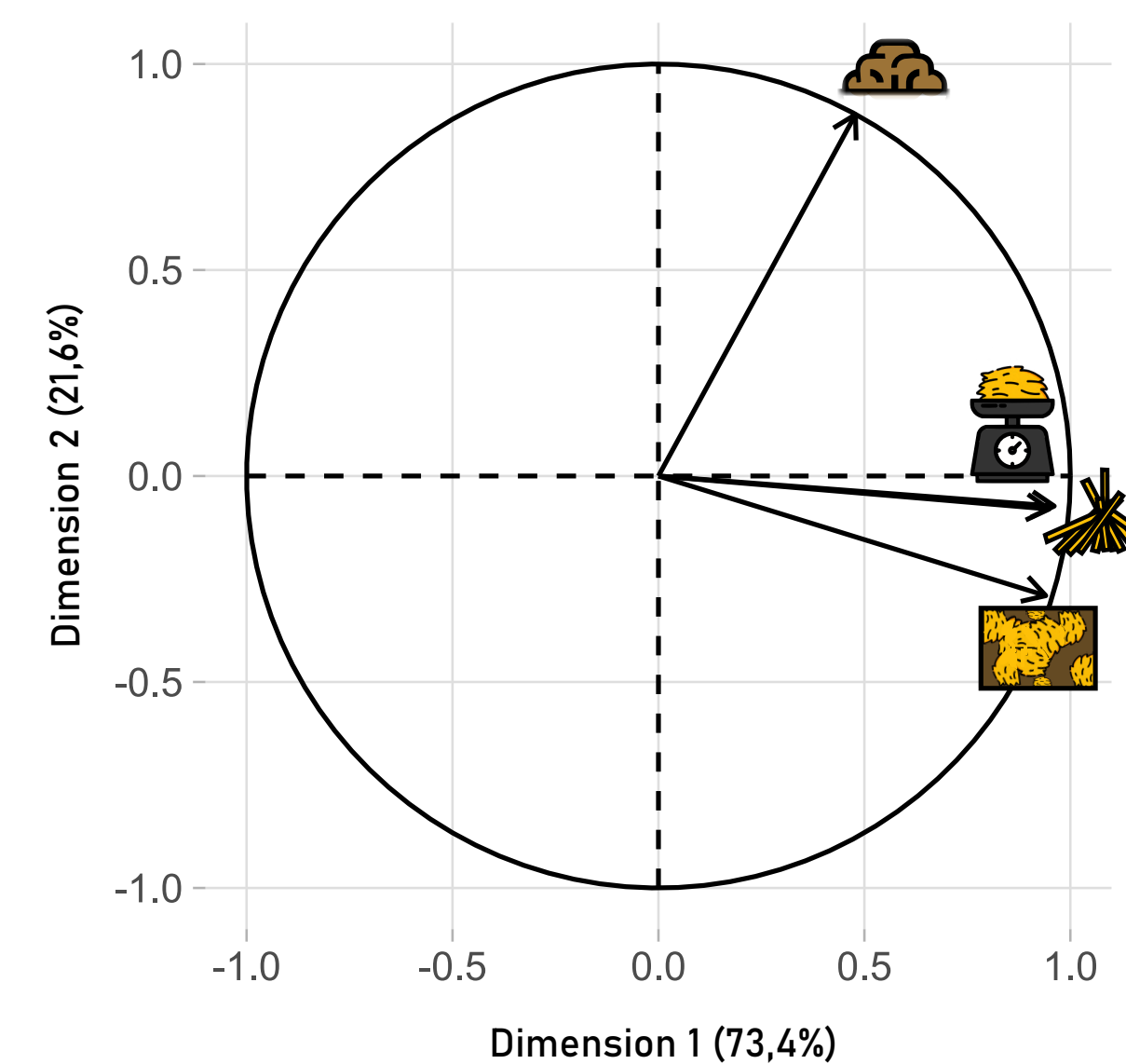
ANOVA 1 y ~ field	R <sup>2</sup> adj. p-value	SSE SSM
transfo. $\sqrt{y}$	0,83 ***	13%
	0,85 ***	11%
	0,77 ***	18%
	0,81 ***	14%



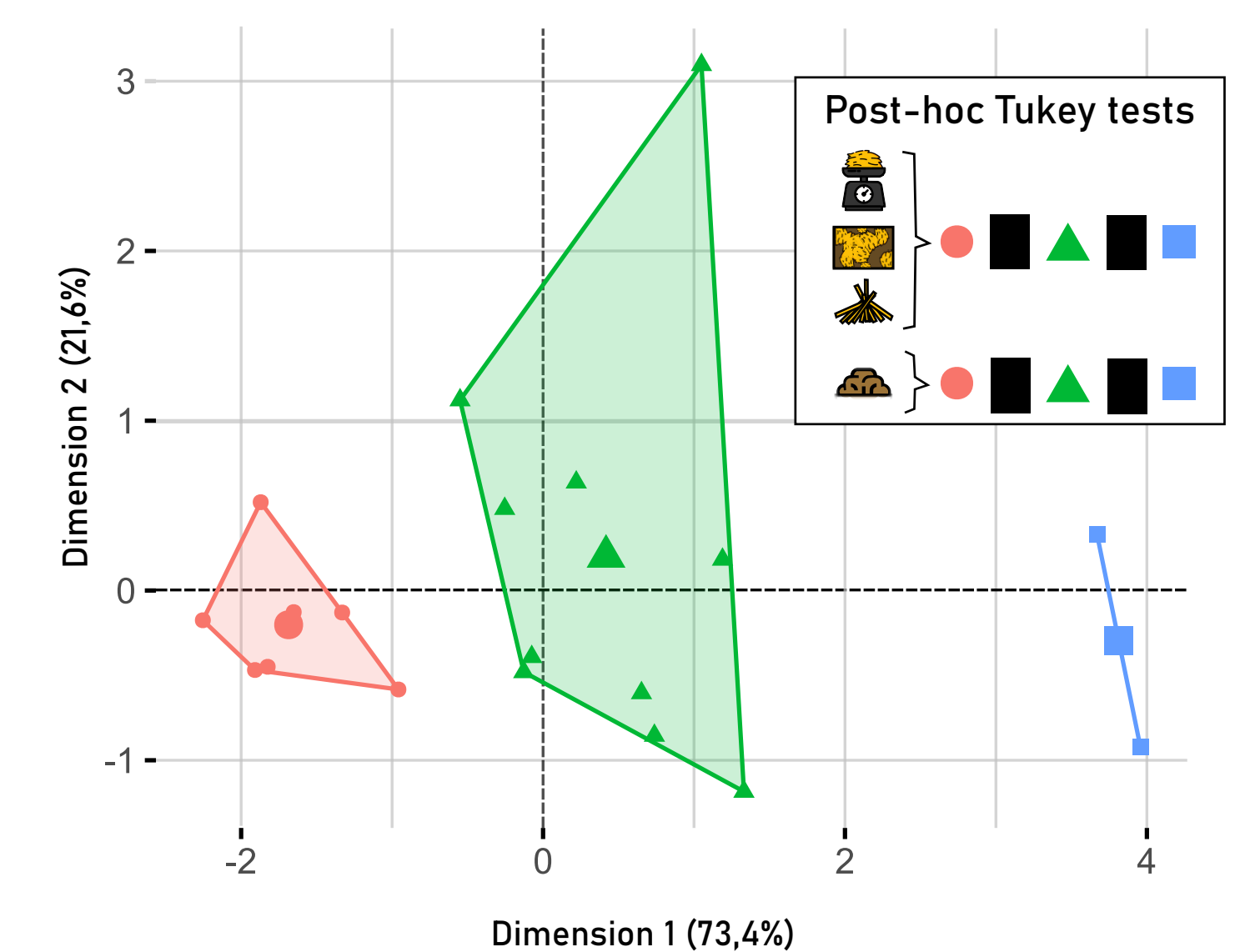
Adequate experimental design

② The protocol was feasible but could be simplified for future uses.

PCA graph of correlations






Fields clustering (HCPC) from the PCA



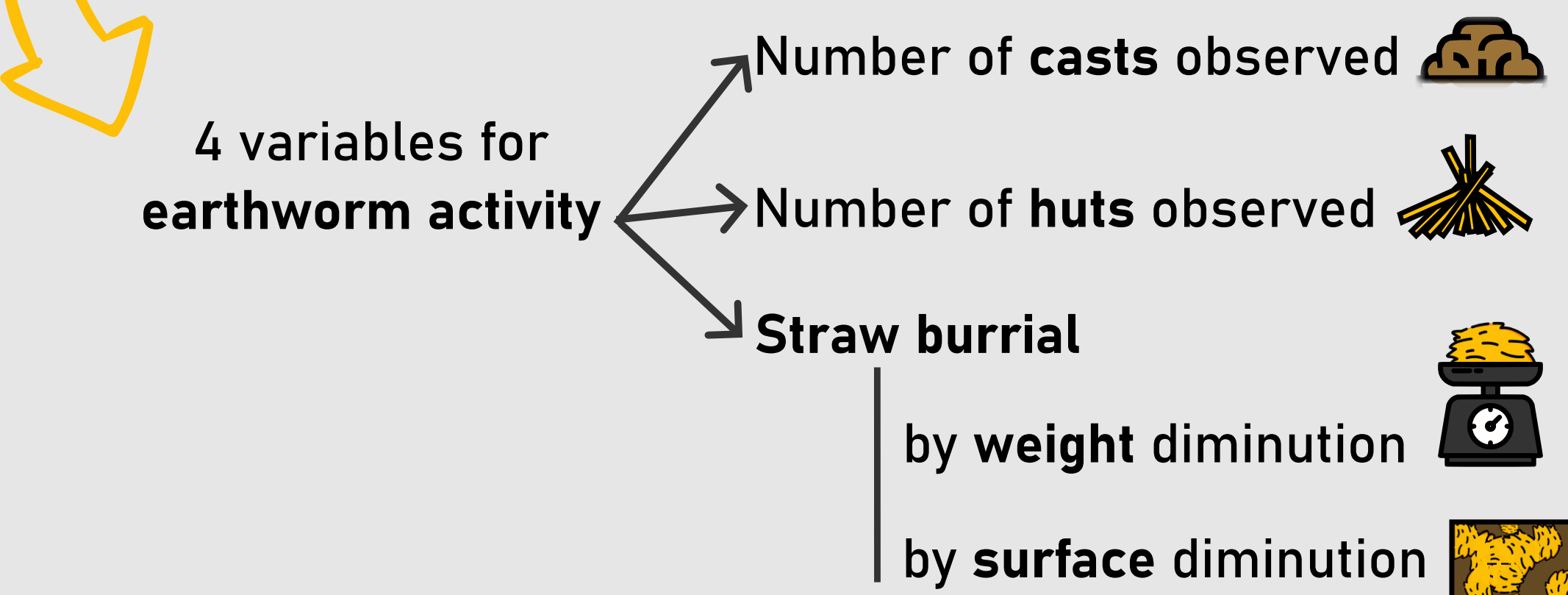
### Measuring only



- Correlated to  & 
- Continuous (good for statistics)
- Less expertise needed
- Big time gain

- No information about 
- No temporal dynamic insight

## Earthworm basket protocol

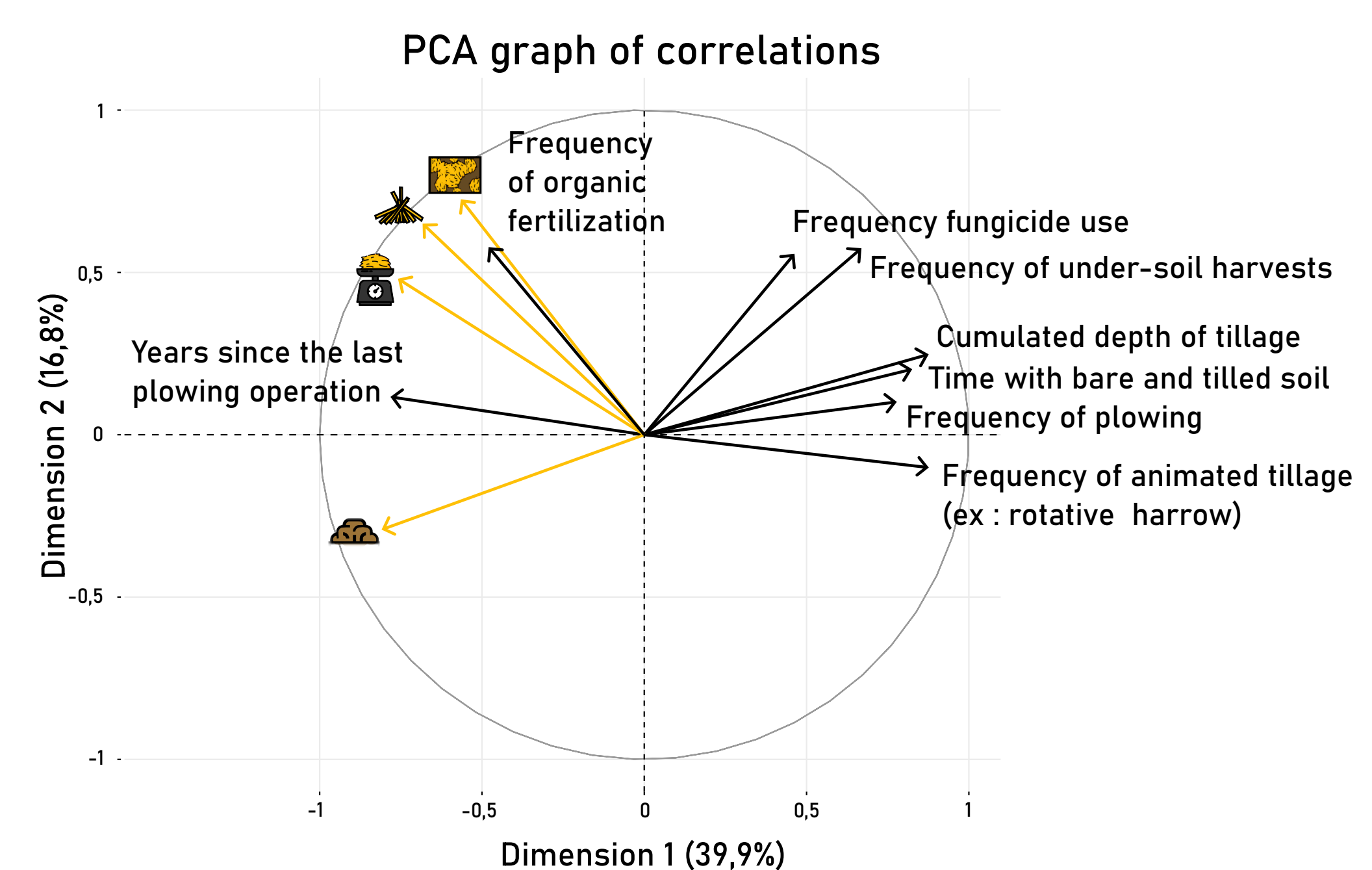


Protocol adapted to winter wheat crops from :

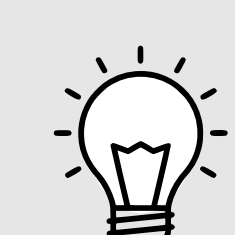
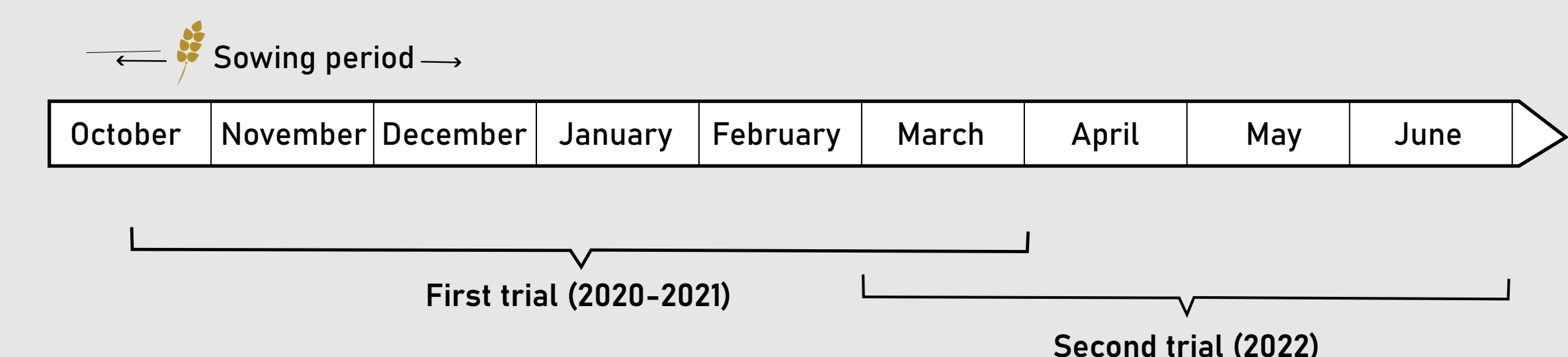
OPVT, 2015 - Paniers à Vers de Terre - Comment observer facilement les activités de surface des lombriciens? - Guide de terrain. Université de Rennes 1/CNRS - OSUR - UMR Ecobio

## Agronomic results

Many links were observed between earthworm activity and cropping techniques applied on the fields for the last 10 years. Most of them are coherent with scientific literature.



Pearson correlation tests showed that **late installation of baskets**, due to late sowing of wheat in some fields, led to **lower earthworm activity**. Fortunately, sowing time was **not correlated to cropping techniques**.



In 2022, we will try mitigating the effect of sowing time by placing **earthworm baskets from March to June** in 20 other wheat fields.

