



# Adding a soil biodiversity monitoring to the French National Soil Quality Monitoring Network : the RMQS-Biodiversity



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In this study, we answered to the request of the French Biodiversity Office (OFB) that wants to develop a global biodiversity surveillance program on the French metropolitan and overseas territory (MNHN UMS Patrinat, 2017). The OFB asked to study the feasibility to add such program (after called RMQS-Biodiversity) to the already existing RMQS.

## The French National Soil Quality Monitoring Network - RMQS -

- ✓ 20 years of soil monitoring
- ✓ 2240 sites spread according to 16x16 km grid in continental France, Antilles, Reunion, Mayotte and Guyana
- ✓ A study area size is 400m<sup>2</sup>
- ✓ Each site is sampled each 10-15 years
- ✓ 12 teams on the field
- ✓ An amazing database : DoneSol with data on soil physical-chemical characteristics, biodiversity, agronomic practices and pollutants

## Step 1 : Ask to experts if we can add a soil biodiversity monitoring to the RMQS

### Yes we can !

According to the experts, the soil biodiversity monitoring fits with the RMQS sampling strategy i.e. 16km x 16km grid, 400m<sup>2</sup> study site, re-sampling of each site every 15 years. A point is still under discussion : experts argued that we need to sample biodiversity exclusively during spring and autumn. However, we need more time if we want to sample all the 180 RMQS planned sites each year.

The experts chose 5 protocols to assess (almost) all soil organisms (microorganisms, meso and macrofauna), plants and three soil functions (Figure 1). They also gave the lab costs of each protocol.

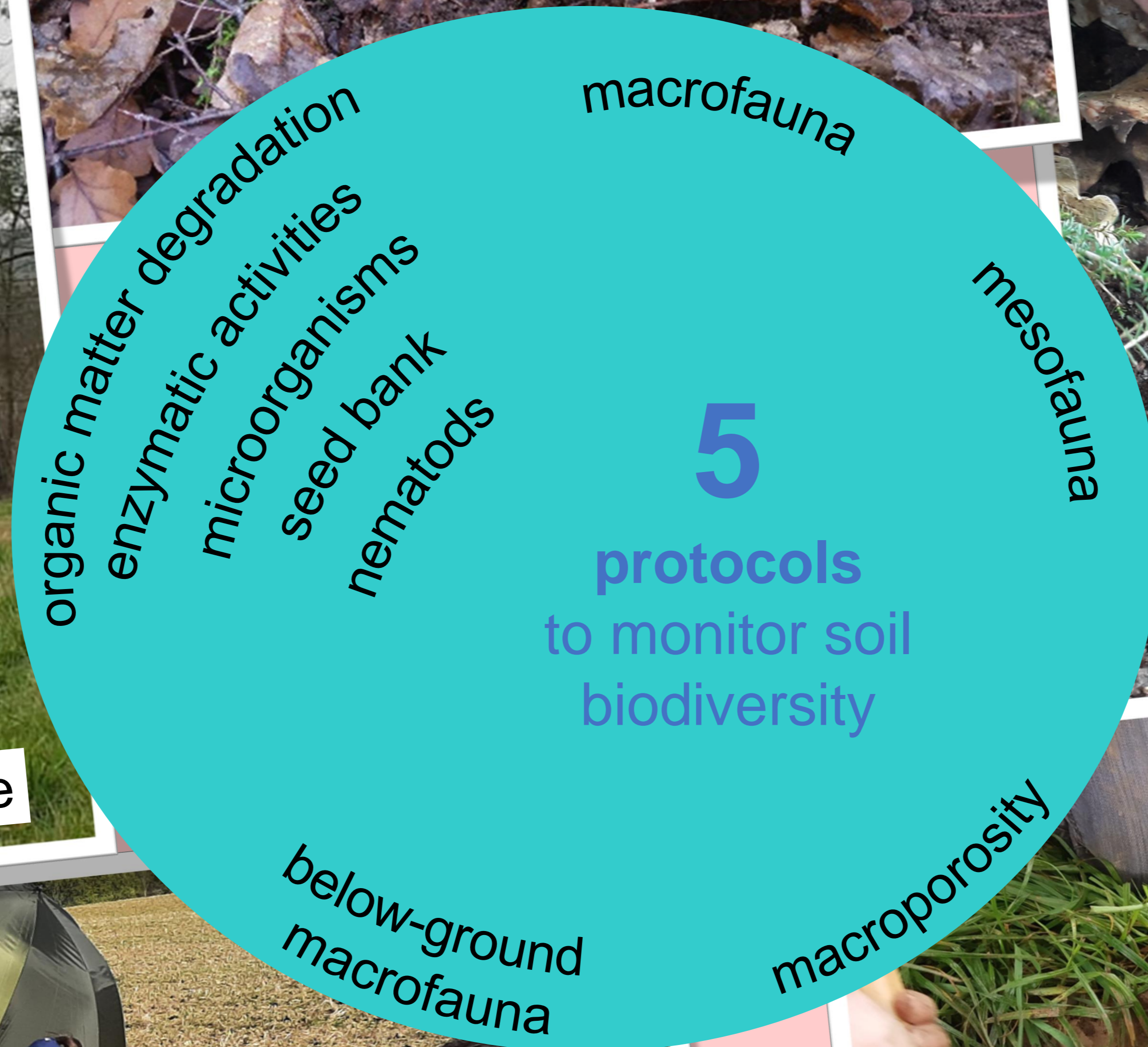
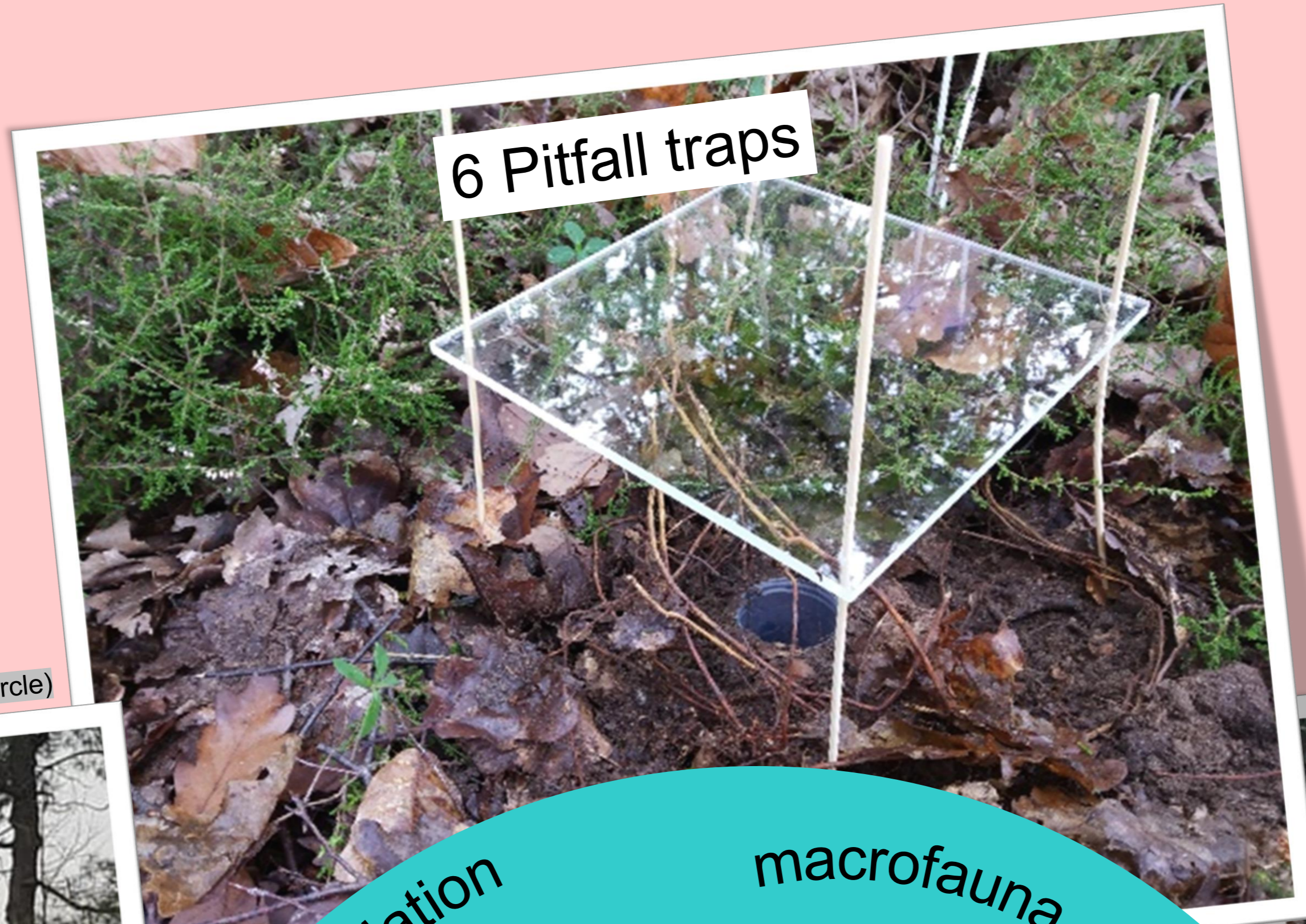


Figure 1. The protocols (photos) and the surveyed soil organisms and functions (circle)



## Step 2 : Test the protocols on the field

We chose 30 RMQS sites representing different sampling durations : some of them should be rapid to sample, some other longer (Figure 2). We performed the protocols on the 30 sites with the 12 field teams to train them. We quoted the time passed for each protocol to assess the costs. We also asked to the teams if they meet difficulties to perform the protocols and for ideas to improve them.

Pitfall traps and mesofauna corers were the most rapid protocols. However, as pitfall traps require to go on the site a week before to install them, this protocol could be constraining for the teams when the site is far from their office. The longest protocol was the hand soil sorting of the soil block and the mustard aspersion (Figure 3).

To assess the field costs, we used as the protocol duration, the quartile 75% (Q75%) in order to avoid the underestimation of extreme site costs. Three people were dedicated to the biodiversity protocols. We consider that the cost for one hour/person was 100 € as for the RMQS. We computed the cost of each protocol as :

$$\text{Field Cost} = \text{Duration Q75\%} \times 100 \text{ €} \times 3 \text{ people}$$

Considering the lab costs, the whole biodiversity monitoring costs :

**5200 € per site**

Figure 3. Duration of the sampling area installation and of the biodiversity protocols (except the surface soil composite sample)

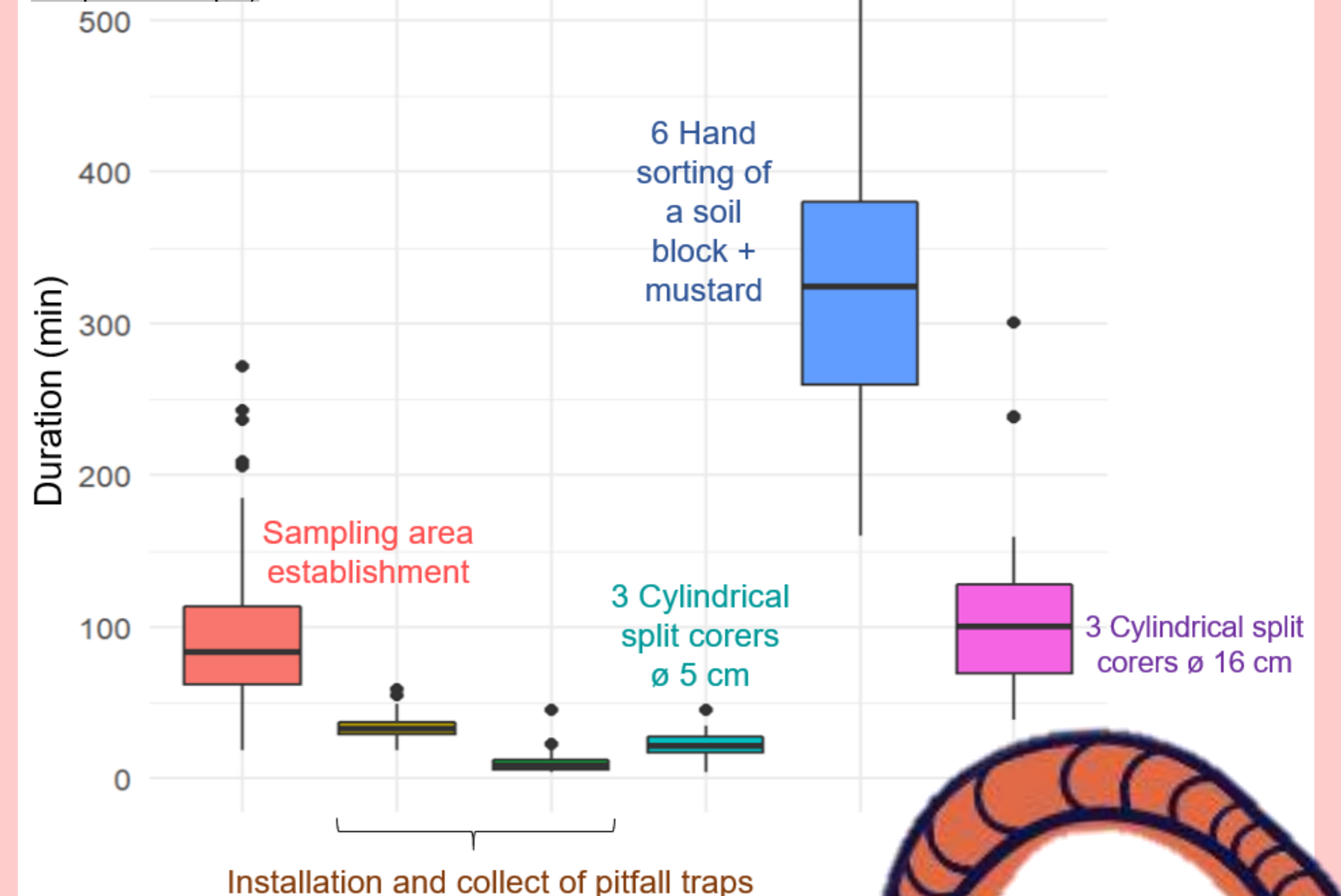


Figure 2. Two RMQS sites (above : Savoie and below : Loire-Atlantique) with the biodiversity protocols. We spot the pitfall traps.



Acknowledgments : This study was funded by the OFB with the GIS Sol support

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References : MNHN UMS Patrinat, 2017. Diagnostic et recommandations pour une stratégie d'acquisition de connaissances naturalistes continentales. UMS 2006 Patrimoine naturel. Paris.

Any questions ?  
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