The *Scherotheca*, an emblematic earthworm of the Pyrénées-Atlantiques under close surveillance

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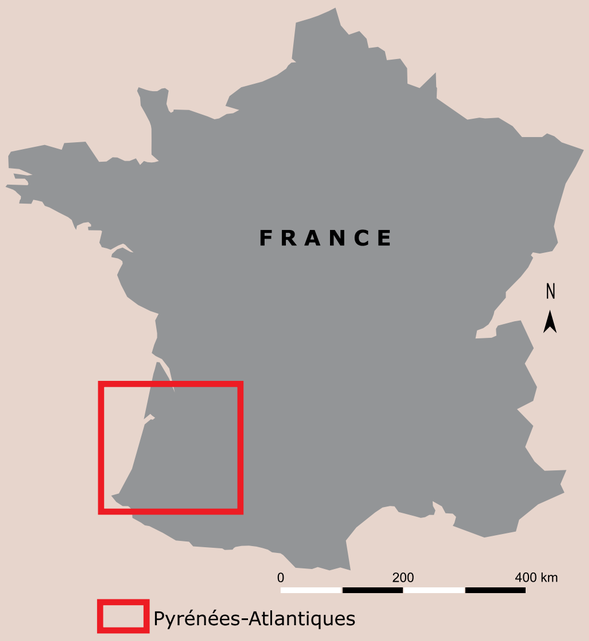
1. The Scherotheca : one of the 64 fantastic ones in the Pyrénées-Atlantiques



For 20 years now, important efforts have been undertaken to improve the knowledge of the natural heritage in Nouvelle-Aquitaine. First to count the species, then to map them, and finally to estimate the risk of their disappearance. According to the Conseil départemental des Pyrénées-Atlantiques (CD 64), one species out of 4 risks disappearing in the more or less long term if nothing is done. This is why it has just committed itself to the challenge of preserving 64 "flagship" species, including the Scherotheca.

To support the CD 64 in its biodiversity conservation policy, a multidisciplinary team composed of naturalists, pedologists, geographers, landscape architects and managers of natural areas has been retained to consolidate local knowledge of the edaphic living conditions of Scherotheca.

2. An earthworm well known locally and apparently related to a type of soil: the VERACRISOL

Among the longest in the world, this earthworm of the Lombricidae family was studied in the 1970s in the Pyrénées-Atlantiques by Marcel Bouché. The sites characterizing the presence of Scherotheca were geolocated by the author and are now known as "Bouché points".

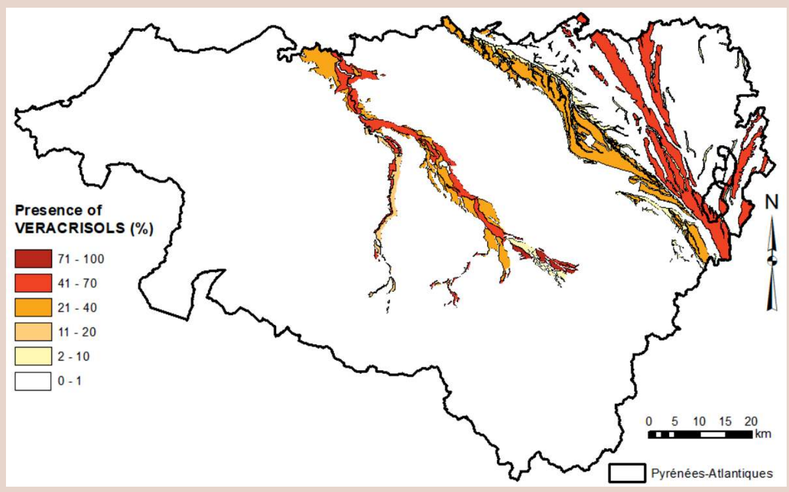
From this first knowledge, Dominique Arrouays mentioned the existence of a relationship between the presence of Scherotheca and a particular type of soil, the VERACRISOL.

3. What is a VERACRISOL?

VERACRISOL is a thick, silty, acidic soil, very rich in organic matter. It has developed under a temperate Atlantic climate. It is mainly found in flat situations in the silty deposits of ancient alluvial terraces. It rests on layers that are not very permeable, favoring waterlogging.

The blackish color of the whole soil profile is linked to the deep incorporation of organic matter. This is due to the intense biological activity of earthworms and more particularly that of Scherotheca.Typical of gorse moors, it is also called "touya soil", "touya" referring to gorse moors.Following massive deforestation in the 1960s to allow the establishment of corn monoculture, this soil is now mostly cultivated.

4. What is the geographical distribution of VERACRISOL in the Pyrénées-Atlantiques?



In the Pyrénées-Atlantiques, regional knowledge of soils is based on the Référentiel Régional Pédologique (Regional Pedological Reference System), which was produced in 2020.

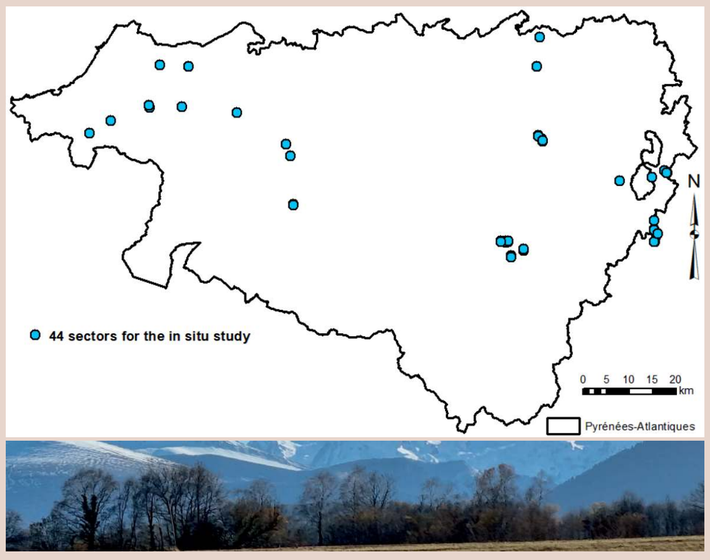
The VERACRISOLS predisposition map was created from the database of this reference system.

It shows that this type of soil is not very widespread, located in the Gave d'Oloron to the west and on the Ger plateau to the east.

5. Meeting the VERACRISOLS

Taking into account (1) the zones of predisposition to the presence of VERACRISOLS, (2) the location of the "Bouché Points" and (3) the modalities of occupation of the ground (cultures, meadows, moors, forests) led us to select 44 sectors.

The in situ study of each one of them allowed us to note the presence or not of Scherotheca and to specify the edaphic living conditions of this lombricid.



6. What protocols are proposed to study the soil conditions for the presence of Scherotheca?

1. Each study area was subjected to a general analysis of the site (topography, land use) in order to select 2 representative plots for soil description and Scherotheca collection.

2. The soil was first described by an auger survey based on the following parameters: pedogenesis, depth, texture, coarse elements, hydromorphy and pH.

3. The collection of earthworms is based on a surface sampling of blocks of earth of dimensions 20 cm*20 cm*20 cm carried out with a spade. A rigorous crumbling allows to draw up a quantitative and qualitative inventory of worms.

4. At the bottom of the excavated area, a solution of mustard and water is poured. This solution, irritating for the earthworm, forces it to come to the surface and thus allows us to integrate it into the collection.

5. In addition to the collection on blocks of earth, we carried out soil turnovers, of the same size and in a random manner on the sector in order to compare the results with those obtained on the plots.

6. The collected earthworms were classified by genus and functional categories (anecious, endogeous, epigeous) in order to isolate the worms of the genus Scherotheca.

7. Results and questions

The VERACRISOL predisposition map proved to be very useful to find this type of soil since 60% of the study areas selected on this criterion did show the existence of VERACRISOL.

In these VERACRISOLS, the presence of Scherotheca was observed in only 30% of the cases.

The "Plugged Points" did reveal the presence of Scherotheca but in soil contexts very different from that of VERACRISOL (BRUNISOL, REDOXISOL).

Land use is not a discriminating parameter in the presence/absence of this earthworm since it was identified in areas of cultivation and grassland (82%) and marginally in moorland (18%).

8. Perspectives

These first works on the edaphic living conditions of the Scherotheca open new avenues of research:

Concerning the collection protocol of this earthworm, the volume of soil collected must take into account its size and its functional characteristics (anecium). Therefore, it will be necessary to increase the volume of excavated soil.

New surveys will have to be carried out in the sectors predisposed to the presence of VERACRISOLS and at the level of the "Bouché Points" to verify the supposed link between Scherotheca and VERACRISOL.

Similarly, the relationship previously established between Scherotheca and the presence of heathland must be further investigated as our initial findings deconstruct this assumption.

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