

French national long-term monitoring program to assess earthworms' response to the agricultural practices in farmlands



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General context and objectives

Due to the **intensification of agricultural practices**, biodiversity has undergone a major decrease in farmlands over the last decades.

In order to **assess the non-intentional effects of agricultural practices**, on biodiversity (birds, plants, beetles and earthworms), and in application of the law about vegetal monitoring, the **French ministry for agriculture** has been carrying out a biovigilance program since 2013.

Farmers and citizens have become more and more interested in **earthworms** because of **their impact on soil functioning** and their importance in provision of many ecosystem services. In order to **improve the knowledge on soil biodiversity** and integrate earthworms in **soil quality diagnostics**, it appeared necessary to gain a large amount of data on their distribution.

- The **objectives** of this national dispositive are :

 - 1) to be able to **detect impacts of agricultural practices**, through indicators of biodiversity
 - 2) to enhance **knowledge of the mechanisms of biodiversity responses to agricultural pressures**

Process

Data entry

Constant variables
such as **climate zone, altitude, soil texture...**

Sampling

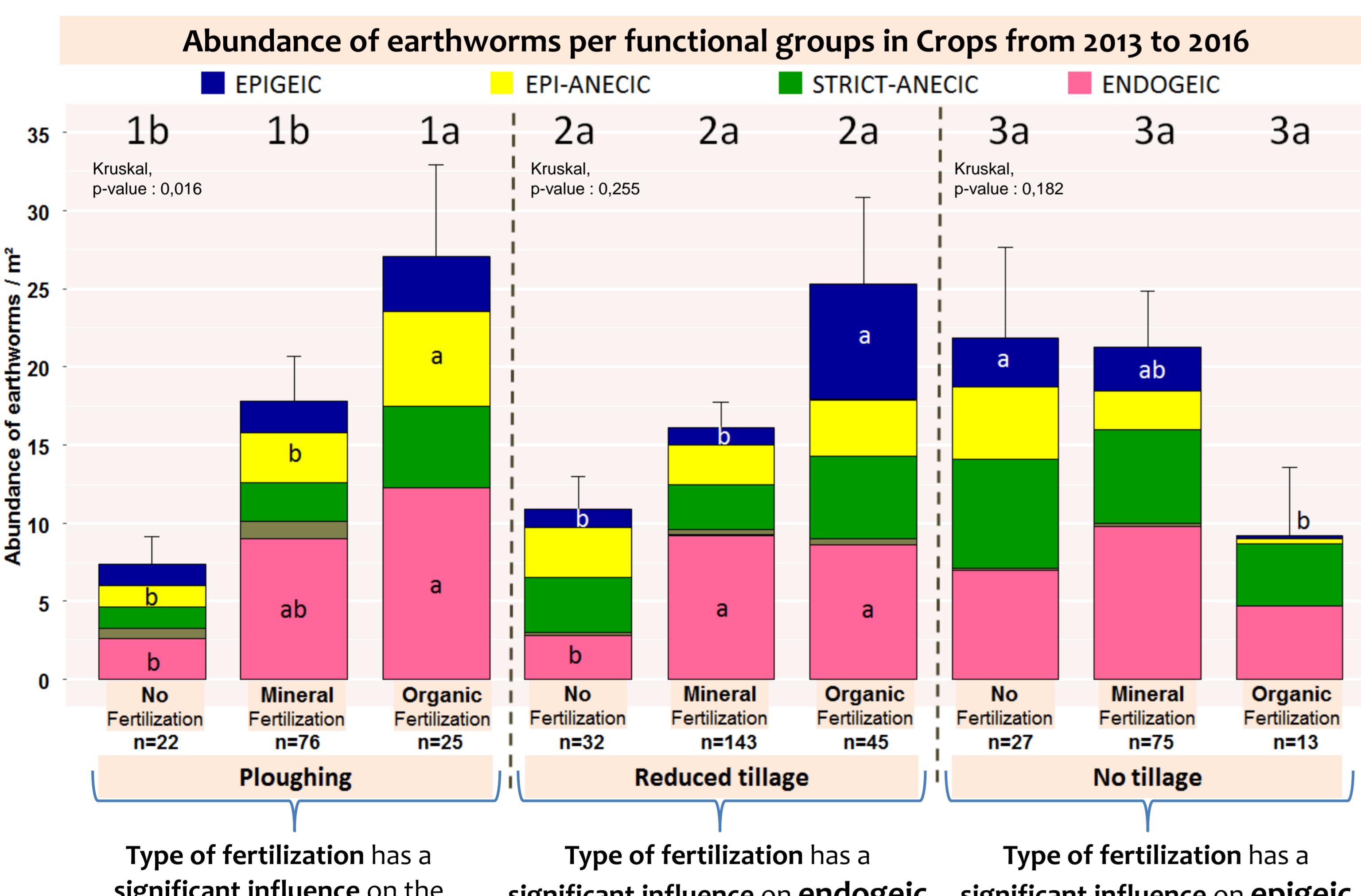
- **each year**
 - with mustard method

In the field, earthworms are

 - **Counted**
 - **Identified** to their **ecological categories**
 - **Photographed** individually
 - **Preserved** in alcohol (96%)
 - **Sent** to our laboratory for taxonomic analysis

Results

Effect of tillage and fertilization



Type of fertilization has a significant influence on the abundance of earthworms

Type of fertilization has a significant influence on endogeic and epigeic abundance

Type of fertilization has a significant influence on epigeic abundance

Same pattern in ploughing and reduced tillage :
the abundance of earthworms is **higher** with organic fertilization
than **without fertilization**

 **Different pattern without tillage :**
the **abundance** of earthworms is **lower** with **organic fertilization** than **without fertilization**

Perspectives

Scientific knowledge about earthworms community can be strengthened thanks to a wide data base

 Around **10,000 adults** of more than 30 common species are kept in alcohol and are available to the scientific community (genetic analysis, morphological traits,...)

 Thanks to data collected through space (all France) and time (since 2013 for minimum 10 years) this network could reveal the potential impact of pesticides

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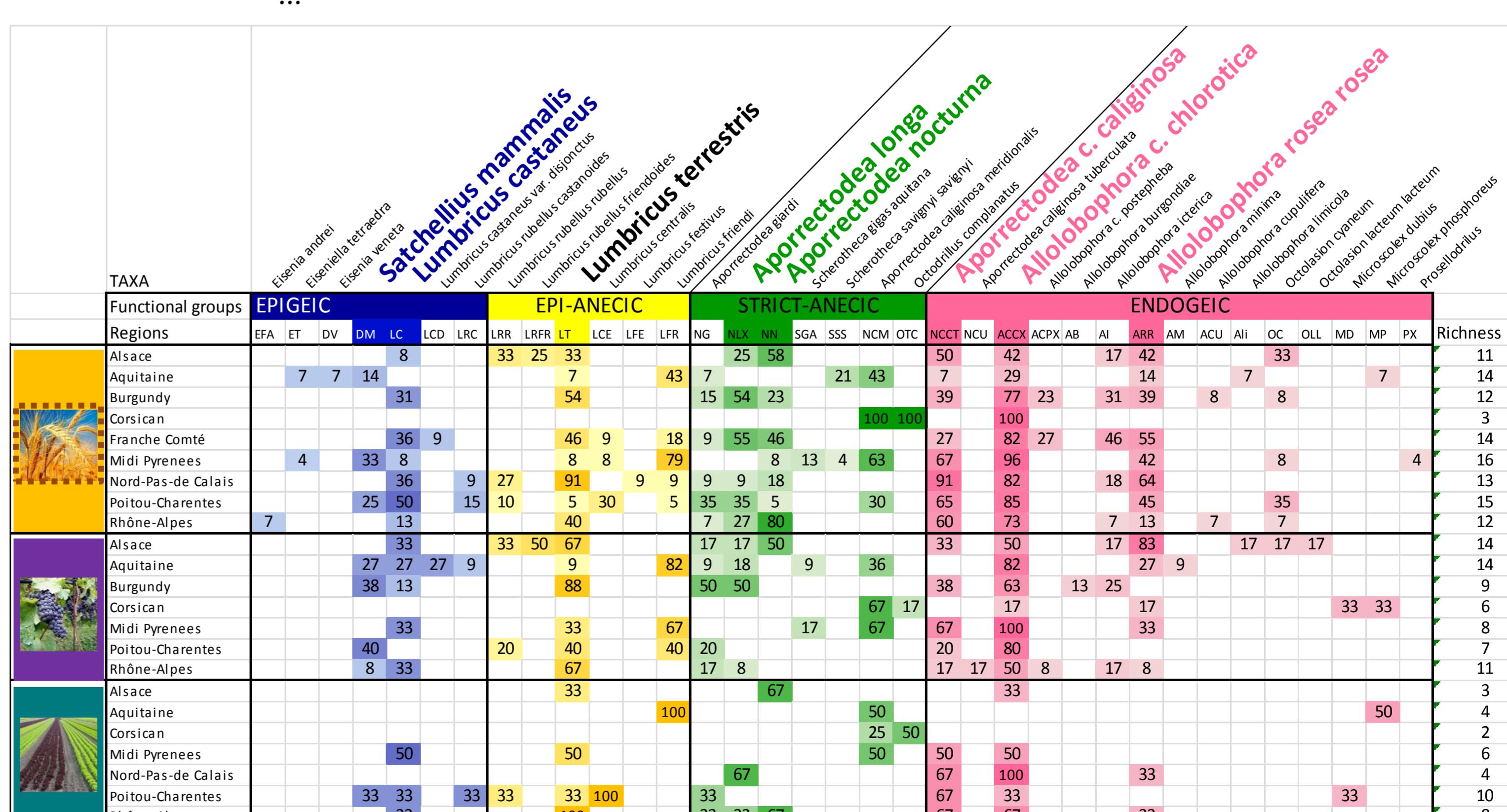


Table of taxa occurrence by land cover and region in 2016