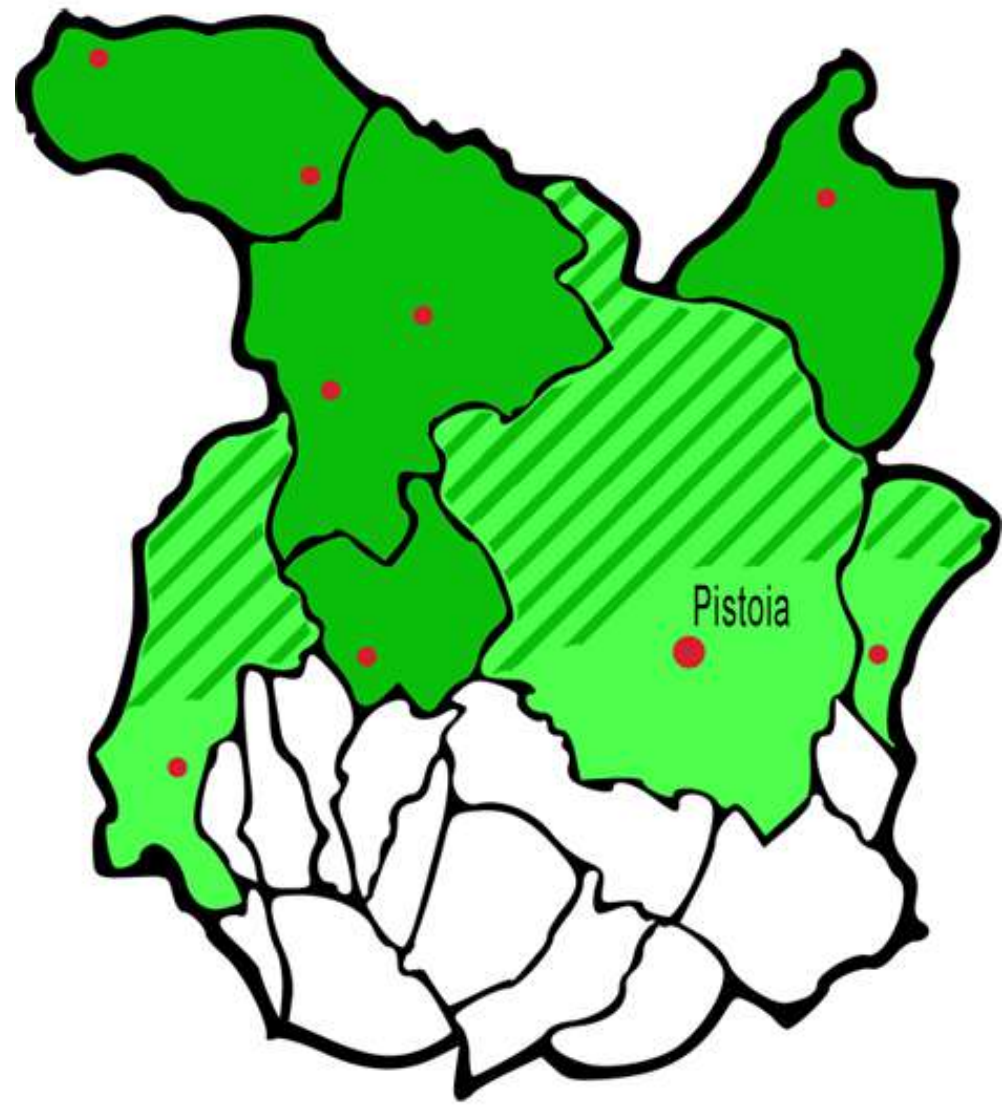


# Historical research for territorial development

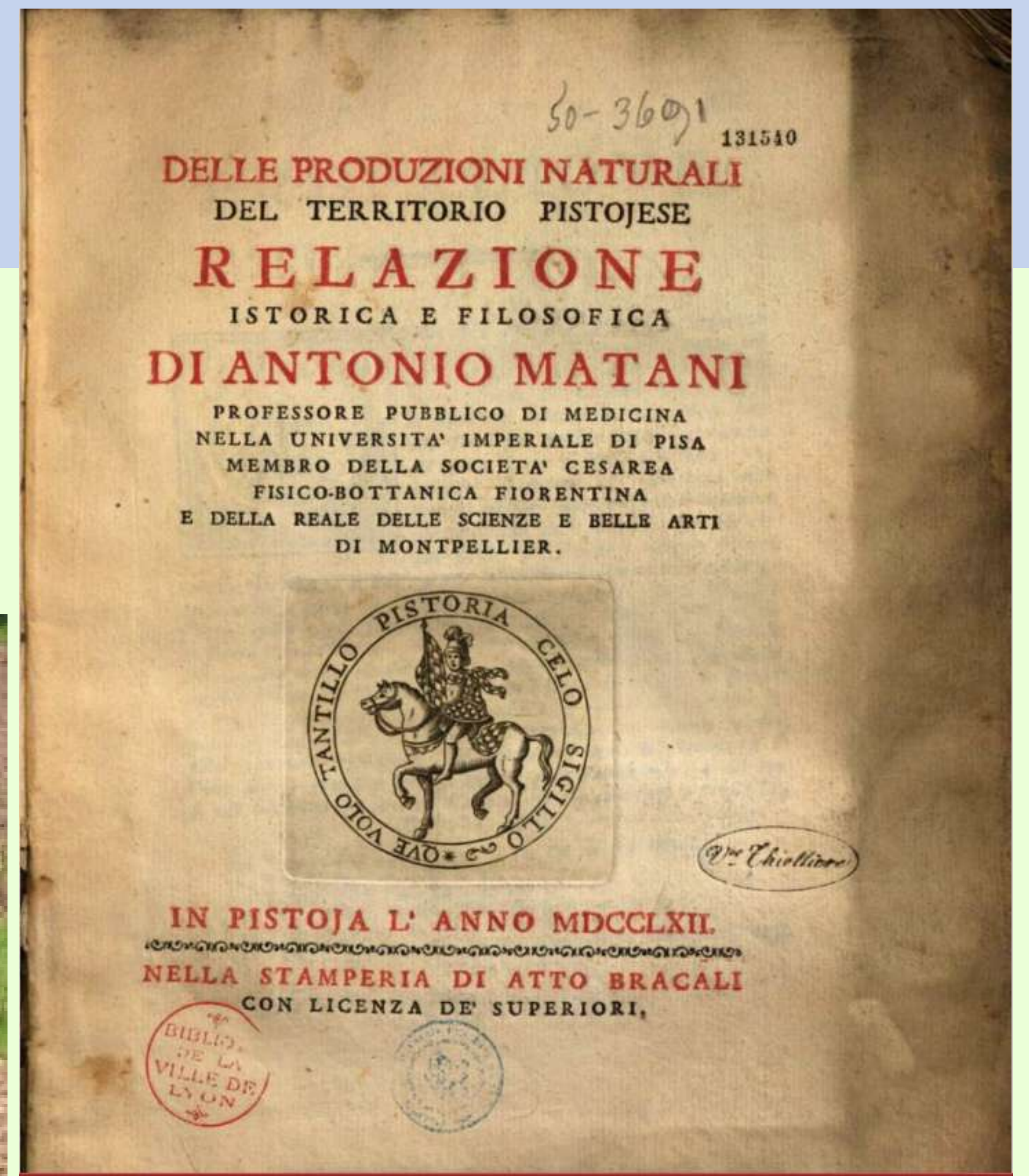


■ Comuni interamente montani  
■ Comuni parzialmente montani



Former Italian president Luigi Einaudi entitled one of his works "*To know to deliberate*". The same spirit animated historical Tuscan officials and scientists, such as Giovanni Targioni Tozzetti and Antonio Matani, during the second half of the eighteenth century.

In local communities, territories and economies, alongside the scientific and technological knowledge a strong historical knowledge is needed as well.

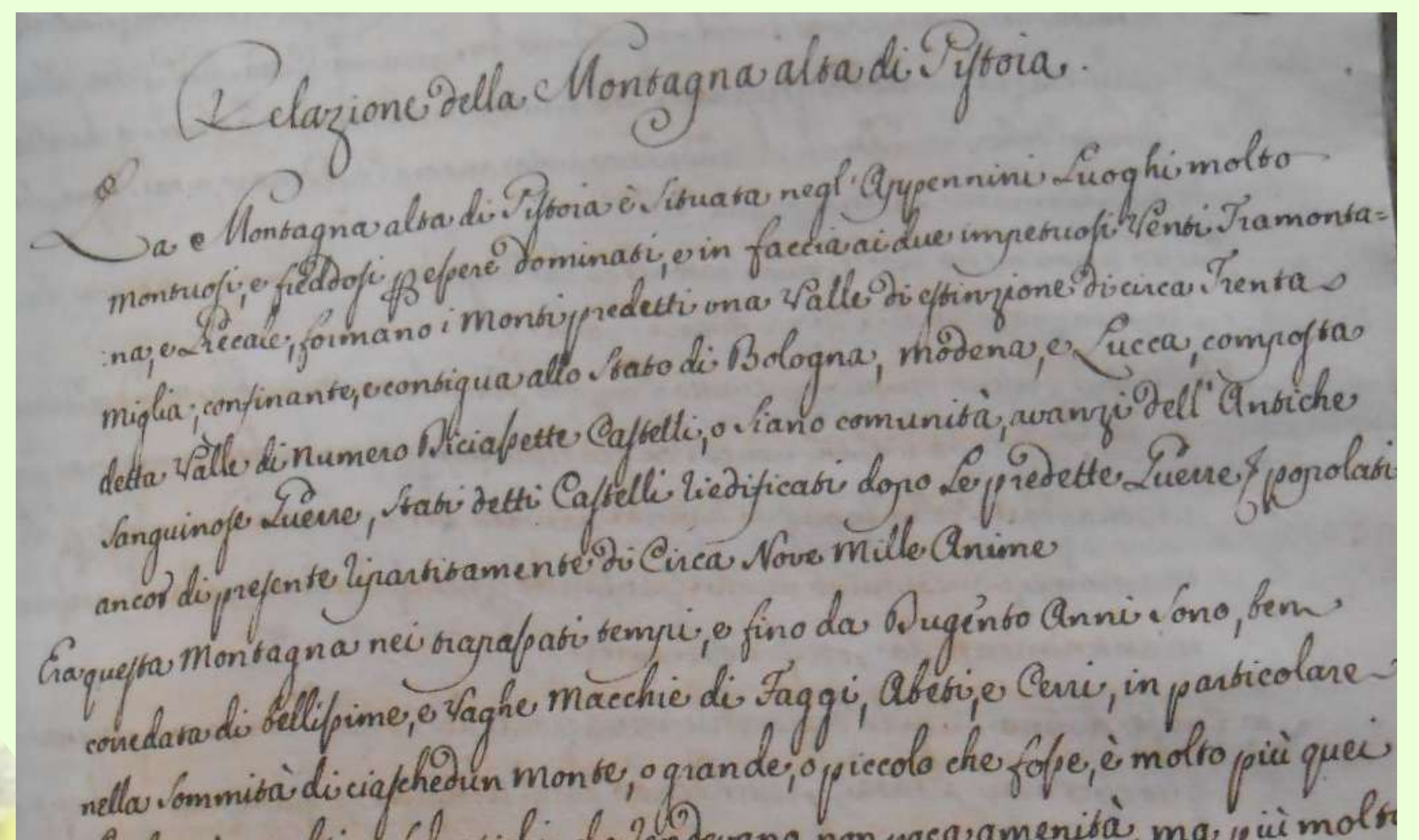


## A DYNAMIC APPROACH

History integrates tourism promotion policies, enhancement of cultural heritage and local development, but also allows to discover the hidden treasures of communities and territories, such as traditional food products or essential oils.

History does not belong to the past only, as a conscious historical approach today makes it possible to interpret tomorrow.

History insights help to generate new ideas, find fresh perspectives, evaluate and produce effective solutions.





# Shared mapping to build a territorial narrative

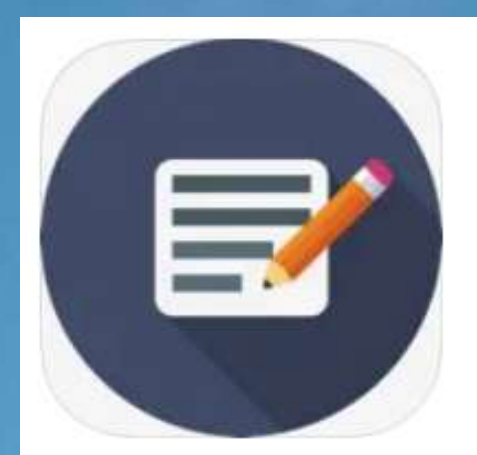
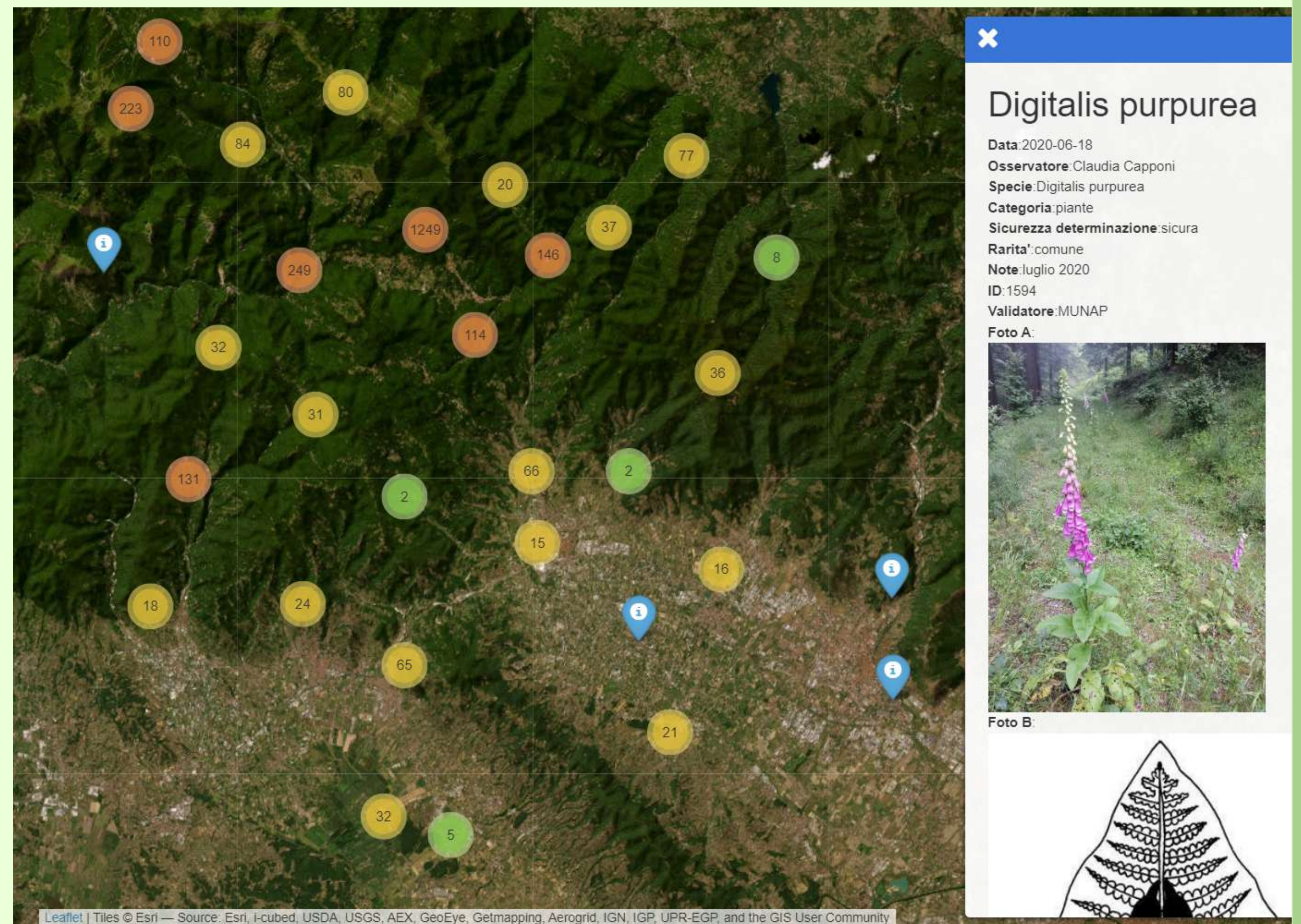
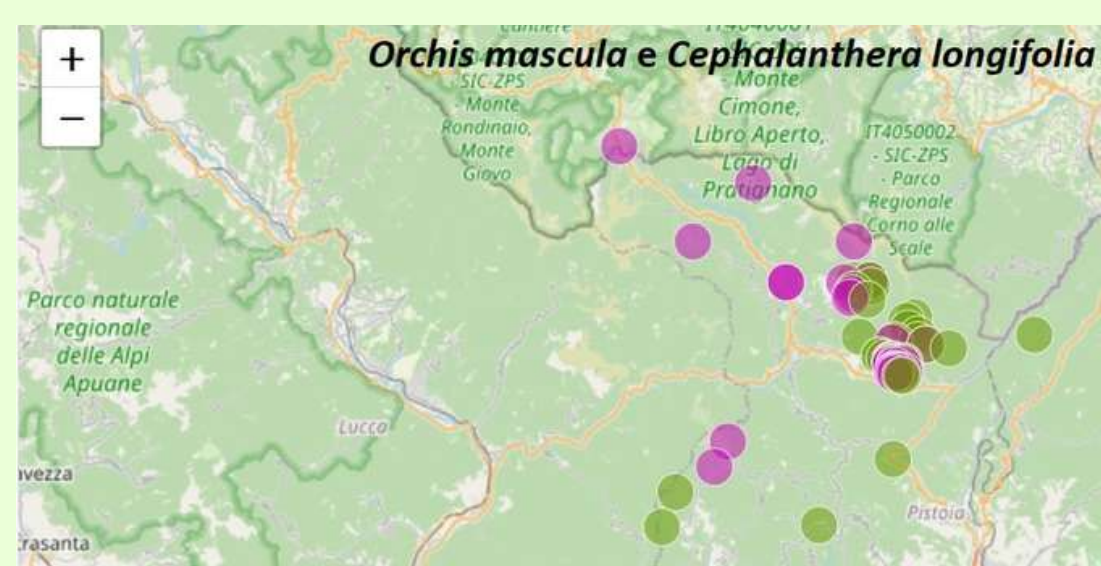
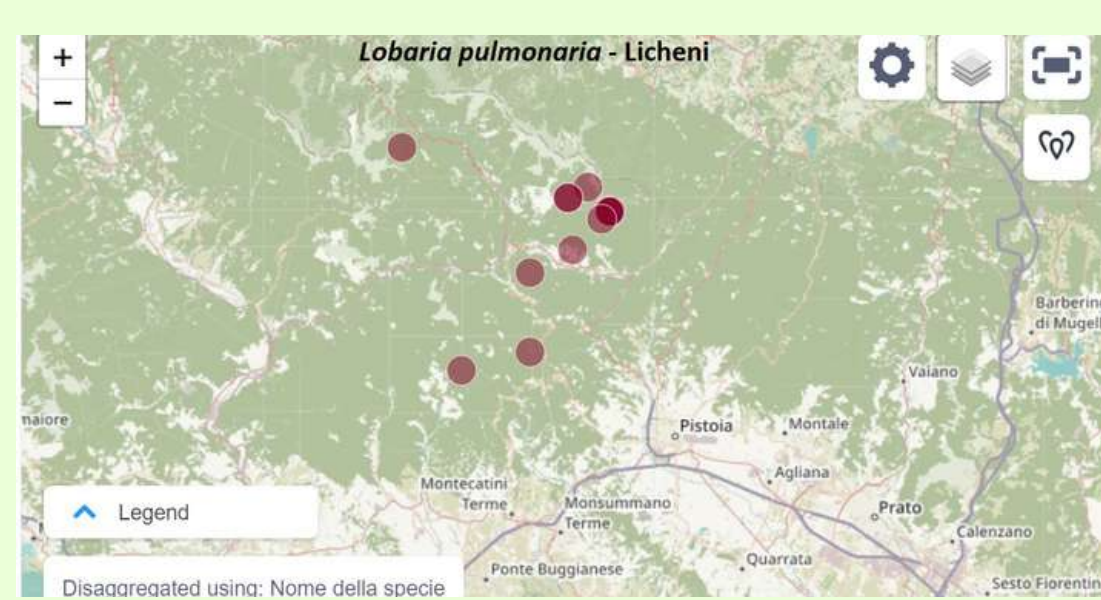
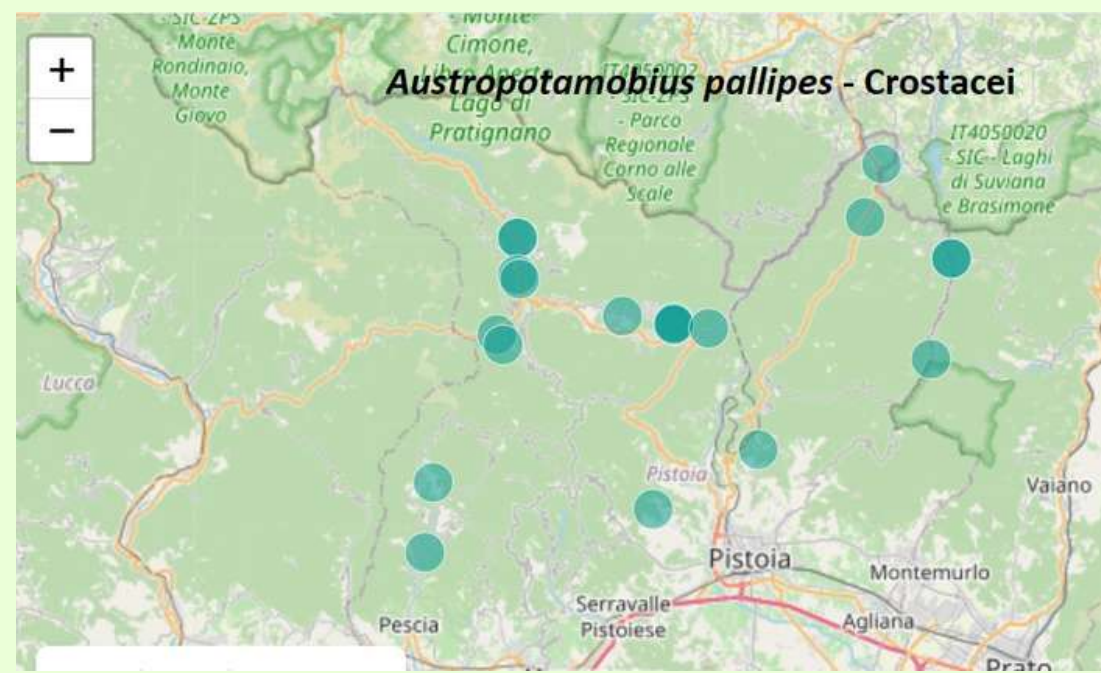


"Mappiamo" is a citizen science initiative, which took its first steps in the territory of the Pistoia Mountains.

Using the Open Kobotoolbox platform, it is possible to geo-reference minerals, plants, fungi, fauna, as well as environments, following a protocol designed by Ecomuseo della Montagna Pistoiese, MuNAP and CNR.

The result is an open and shareable database populated by verified observations.

Mapping  
to explore



Thanks to the KoboCollect (Android) and the GIC Collect (iOS) applications, enabled with the "MunapBiodiversity" questionnaire, it is possible to carry out field observations, which are validated by a local validator. All data collection can take place offline and by web form.

Sensitive data on rare or fragile species is protected to prevent vandalism and predation.

**Take part too!**

Scan the QR Codes below for basic instructions and to participate in "Mappiamo".

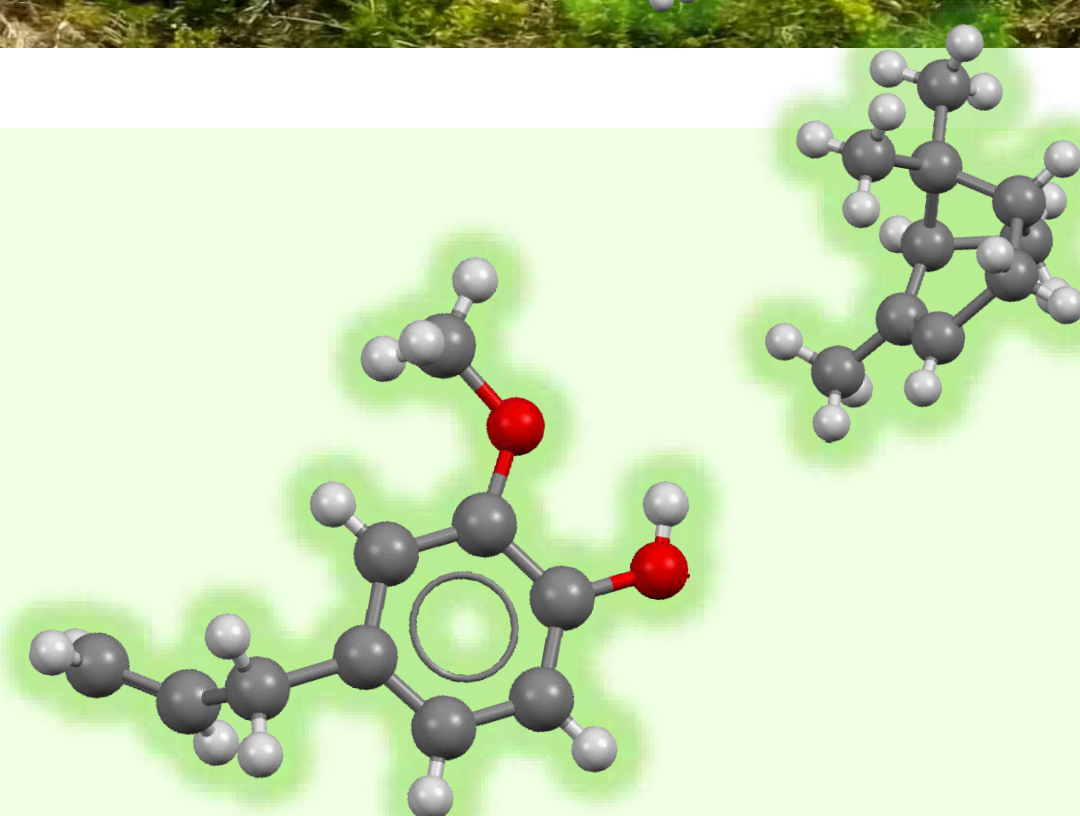
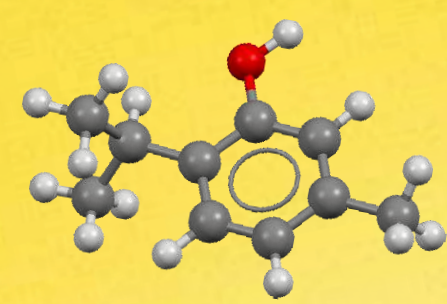




# Looking for molecules

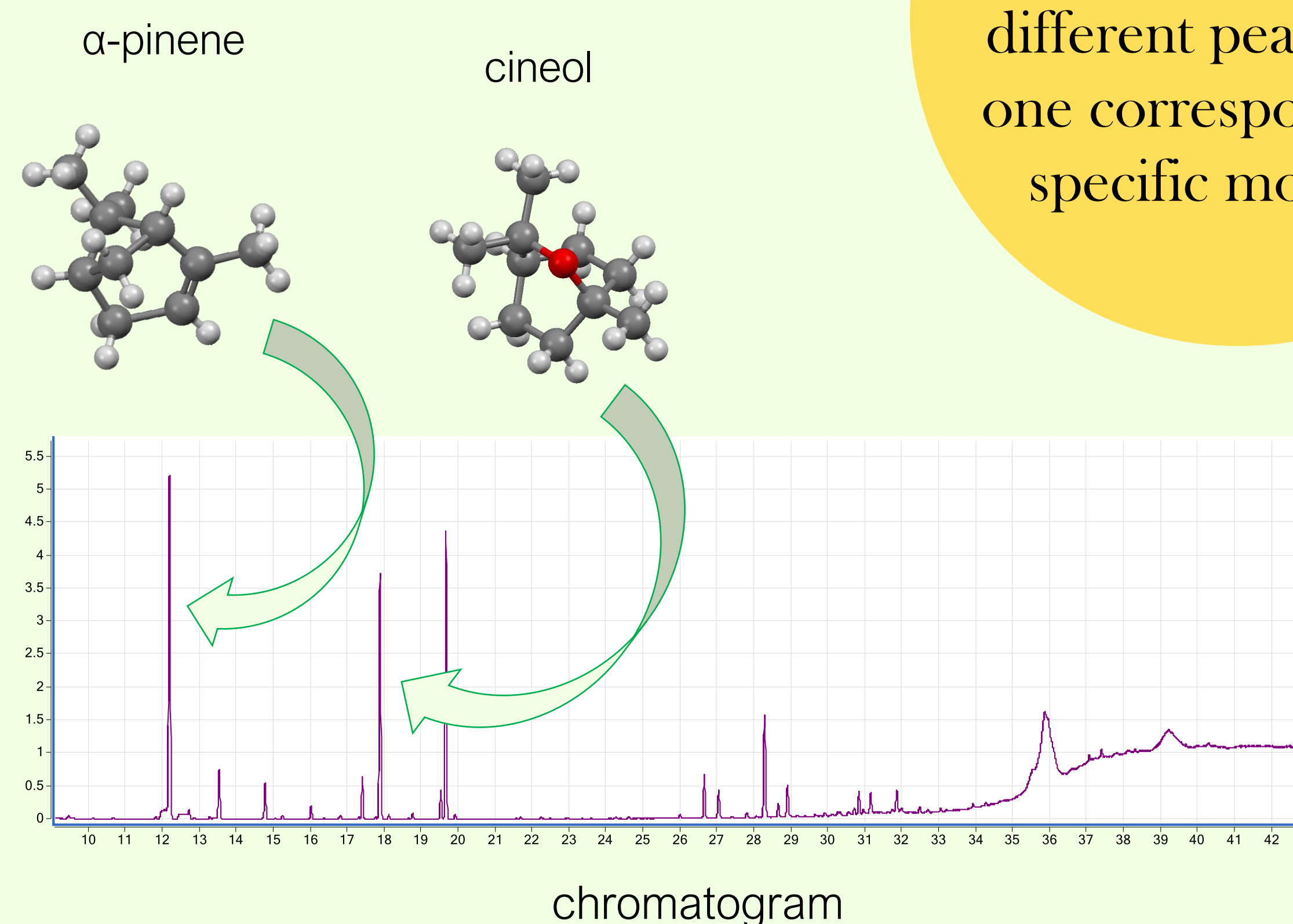
The Pistoia Mountains host a variety of aromatic plants including thyme, helichrysum, juniper, mint and savory. Their fragrances come from the combination of different volatile molecules, known as terpenes

Molecule comes from the Latin word *moles* (matter) and means a group of atoms linked together through chemical bonds



The molecule investigator looks for the key substances of a fragrance by analyzing different plant tissues (leaf, stem and flower)

The gas-chromatograph and the mass-spectrometer allow to split and identify the terpenes, showed in a chromatogram



The chromatogram is a graph showing different peaks: each one corresponds to a specific molecule



# Essential oils: when the help comes from the nature



Essential oils extracted from aromatic plants contain volatile substances giving the product unique scents and fragrances

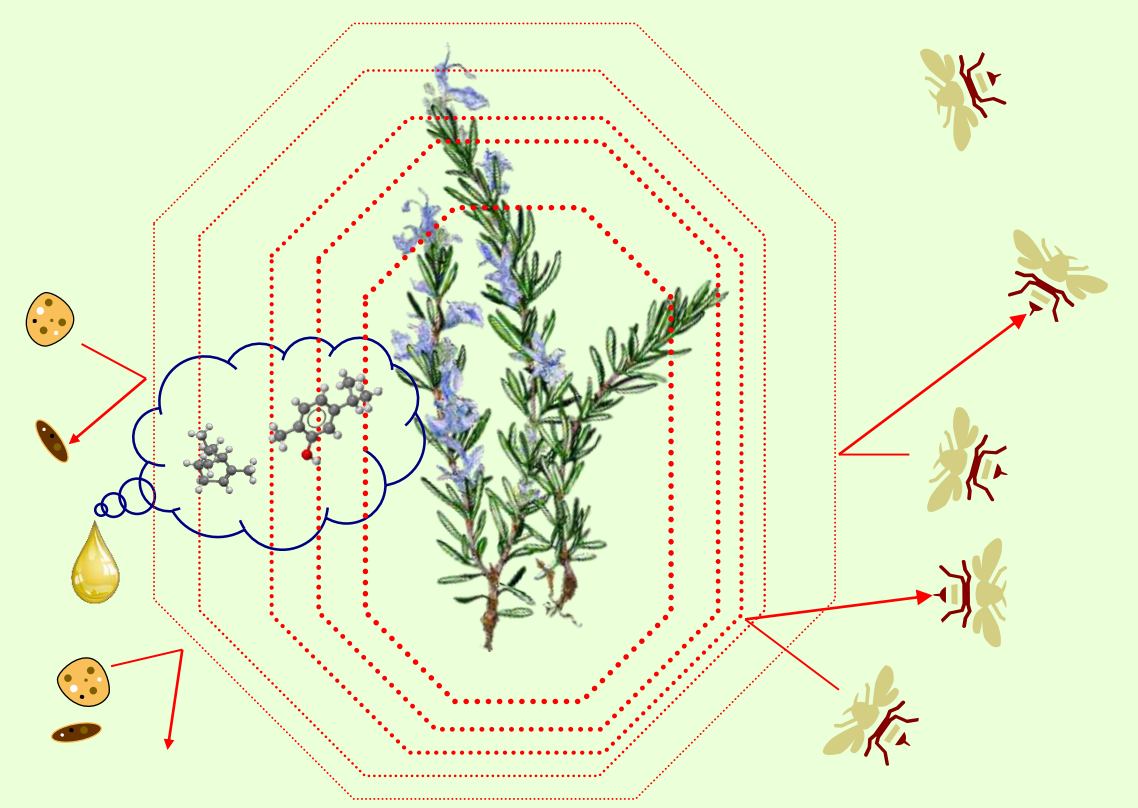
## Applications



Essential oils:  
complex mixtures  
of volatile  
molecules

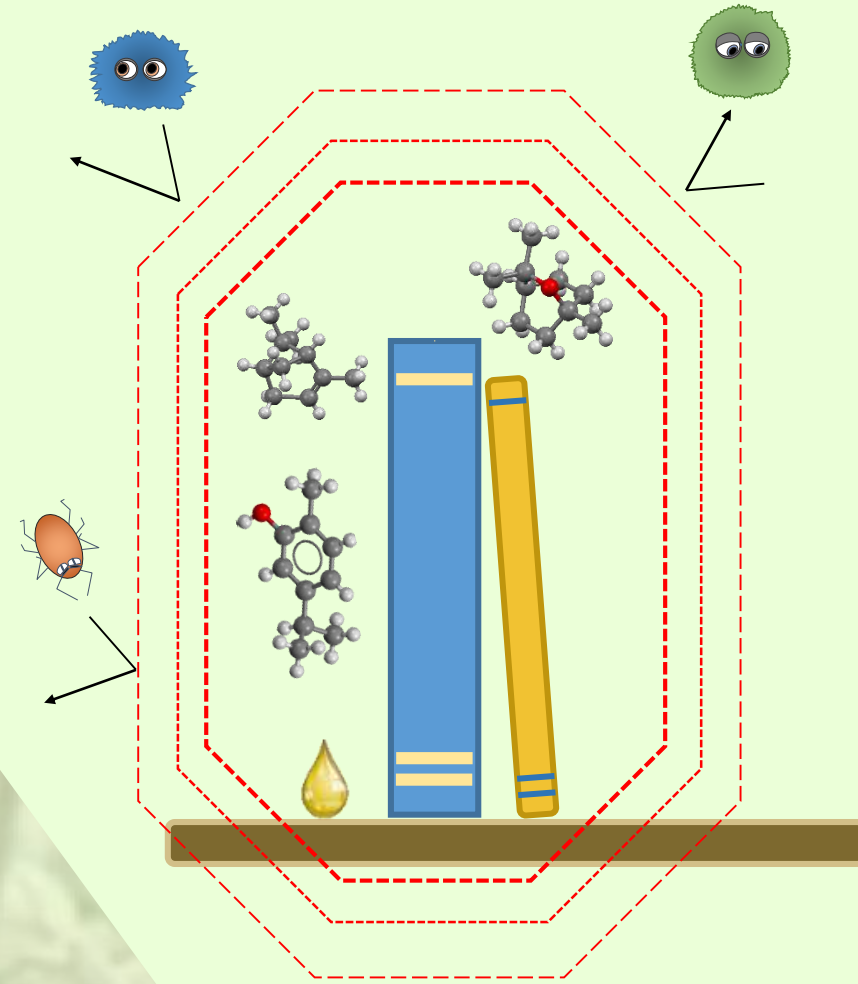
### Plant pathology control

Production of  
biopesticides



### Cultural heritage preservation

Protection from degrading  
microorganisms and insects



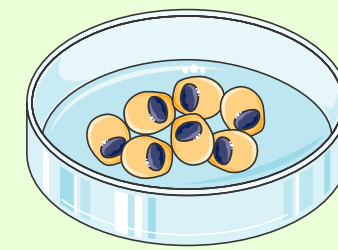
### Perfumery and cosmetics



### Phytotherapy

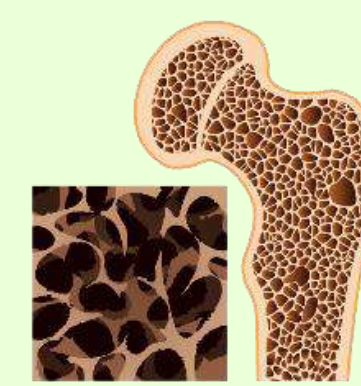
Experimental treatment of bone  
cells, aiming to alternative  
osteoporosis remedies

Bone cells

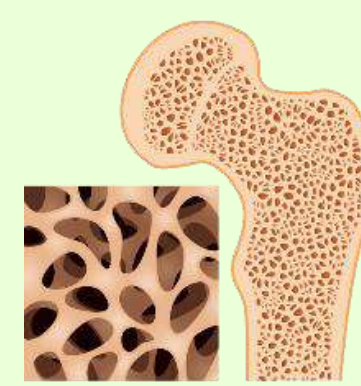


Essential oil

+/-



Osteoporotic bone



Health bone

### Food and liquor industry

Food preservatives and  
flavourings - additives for  
liquor production





# From plant to essential oils: the THEO project for the cultural heritage conservation

## Step 1. Plant collection

Thyme is an aromatic plant spontaneously growing in the area of the Pistoia Apennines. Plants from different areas display different morphological traits and fragrances

Roncacce (PT)

Doganaccia (PT)

Pracchia (PT)



The essential oil extracted from thyme displays plenty of properties (antiseptic, anti-inflammatory, pesticide) making this product extremely attractive for industries

## Step 2. Plant propagation

Propagation by cuttings allows multiplying thyme plants at laboratory scale. The terpenes in plant tissues can be identified by gas chromatography-mass spectrometry



## Step 3. The application

The essential oil extracted by thyme can be used for conservation purposes within the field of cultural heritage

