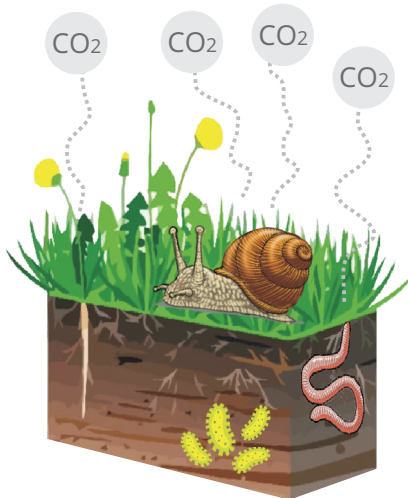




THE SOIL BREATHES

Living organisms (animals, nematodes, microflora...) and roots that inhabit soil breathe. This leads the soil to deliver carbon dioxide (CO₂), which is released into the atmosphere.

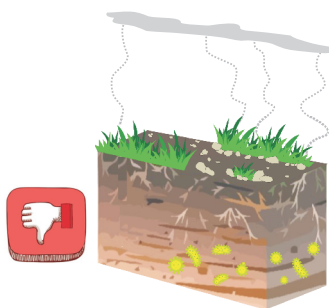


A VALUABLE INDICATOR

The amount of CO₂ produced by the soil microflora through respiration can be considered as an indirect estimate of the number of microorganisms inhabiting the soil.



This metric is also an estimate of the health of the soil microbiological community.



DO NOT BE CONFUSED

Although soil microflora emits CO₂ through respiration, it participates in many ecological processes that directly and indirectly lead to the capture and storage of atmospheric CO₂ into the soil, resulting in a highly positive net contribution against climate change.

[extra info](#)

SOIL MICRO-FLORA PART 2

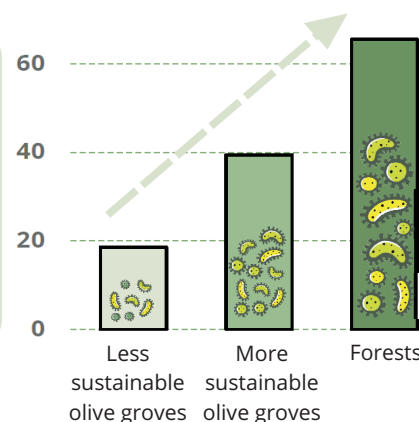


DID YOU KNOW THAT...

soil microflora plays a key role in the circulation of nutrients through the soil, making them more easily available to plants?

RESPIRATION

Micrograms of carbon in the form of CO₂ emitted per gram of soil along 24 hours (measured in Spanish experimental plots of SUSTAINOLIVE and adjacent forest patches)

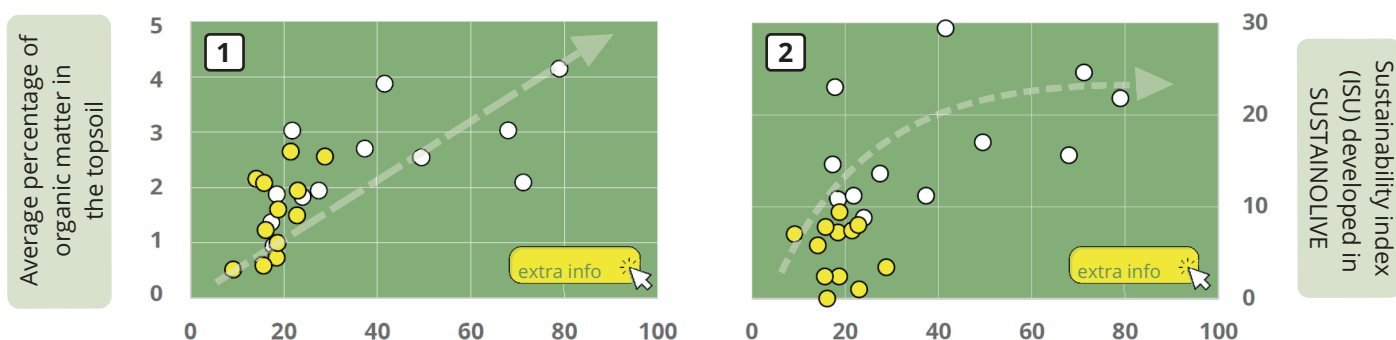


ONE REMARK

A microgram is one millionth of a gram, that is, in a gram there are a million micrograms.

Topsoil respiration rates are **twice** as high in the more sustainable olive groves. In addition, topsoil respiration in the more sustainable olive groves accounted for **60% of the respiration measured in the soils of adjacent forest patches** considered as reference. This means that the application of sustainable management practices leads to a much more abundant (and thus likely also a more biodiverse) soil microflora.

Some relations of interest found in the Spanish experimental olive groves of SUSTAINOLIVE



RESPIRATION

Micrograms of carbon in the form of CO₂ emitted per gram of soil over 24 hours

Olive groves with ISU>10 ○ Olive groves with ISU<10 ●

Soil microorganisms use different forms of carbon present in soil organic matter as a source of nutrients and energy to carry out their biological functions. This explains that the greater the amount of organic matter available in the soil, the greater the rate of soil microflora respiration (graph 1). Management practices aimed at increasing the availability of organic matter in olive groves soils will improve the quality of soil microbiological communities and, therefore, will result in greater sustainability rates of olive groves (graph 2). Such practices include **tillage reduction**, application of **shredded pruning waste** and **organic fertilizers** such as manure or composted olive mill pomaces and, especially, the maintenance of **cover crops**.

KEEP IN MIND THAT...

a number of factors exists that limit the activity of the soil microflora which we may detect through a decrease in the amount of CO₂ produced by respiration, including:

- ✓ Extreme temperatures
- ✓ Extreme humidity or drought
- ✓ High erosion
- ✓ Low availability of nutrients
- ✓ Toxic concentrations of heavy metals
- ✓ Poor drainage
- ✓ Excess aeration

What are the olive grove management practices that may trigger these limiting factors?

- ✓ Intensive tillage
- ✓ Bare soils
- ✓ Application of pesticides, especially broad spectrum ones
- ✓ Unbalanced chemical fertilization
- ✓ Low soil organic matter rates