



NITROGEN AVAILABILITY

the good practices



THE
RESULTS OF
SUSTAINOLIVE

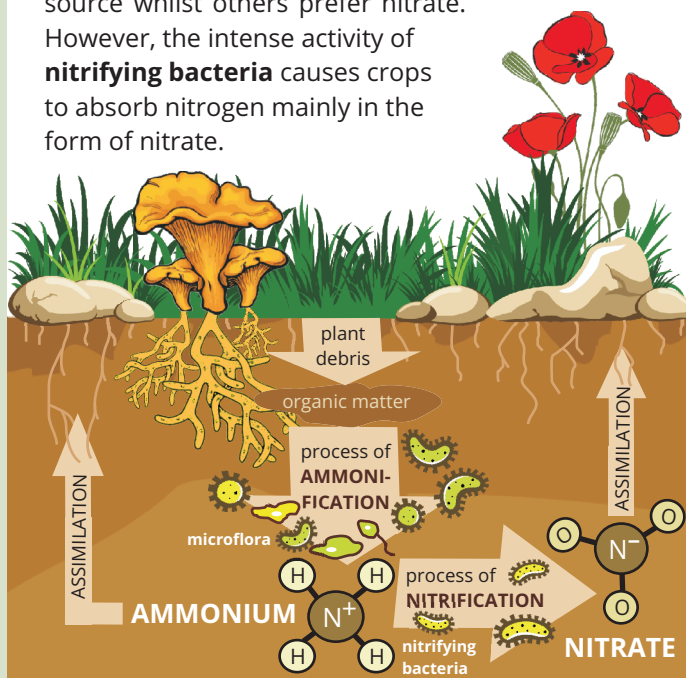
SUSTAINOLIVE.EU

SOME KEY CONCEPTS

THE NITRIFICATION PROCESS

Soil decomposing organisms process organic matter from plant debris, resulting in **AMMONIUM** as the main form of N in the soil. Soil nitrifying bacteria convert ammonium into **NITRATE**, another form of nitrogen. Some plants prefer ammonium as a nitrogen source whilst others prefer nitrate.

However, the intense activity of **nitrifying bacteria** causes crops to absorb nitrogen mainly in the form of nitrate.



THE MINERALIZABLE NITROGEN

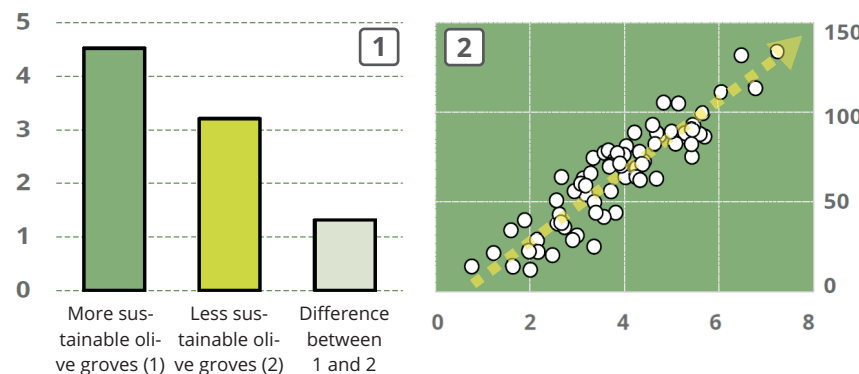
It is the organic nitrogen of the soil resulting from the decomposition of plant debris which soil microflora can convert into ammonium and nitrate assimilable by plants.

DID YOU KNOW THAT...

the loss of topsoil involves the loss of essential nutrients, including nitrogen? For instance, in SUSTAINOLIVE less sustainable olive groves, an average of **16.6 kg of organic nitrogen per hectare** is lost due to soil erosion each year. That would be the equivalent of spending €40 on 36 kilograms of crystalline urea and pouring it down the drain.

extra info

THE NITROGEN RESERVE



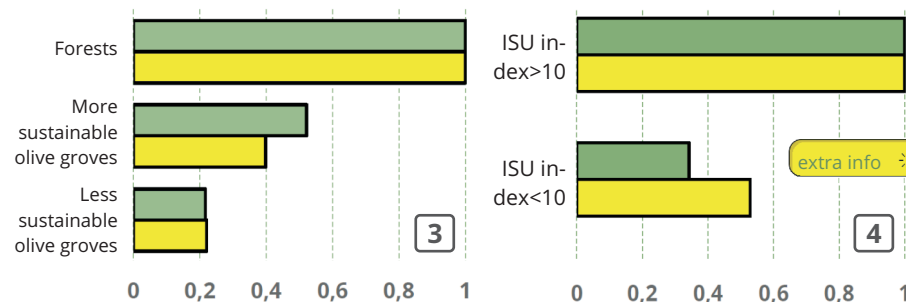
Amount of organic nitrogen in the topsoil of the experimental olive groves of SUSTAINOLIVE in Spain (tons per hectare)

Amount of organic matter in the topsoil of the experimental olive groves of SUSTAINOLIVE in Spain (tons per hectare)

When sustainable management practices are applied (especially the maintenance of an herbaceous cover crop), the amount of organic N stored in the soil increases by 30% (graph 1).

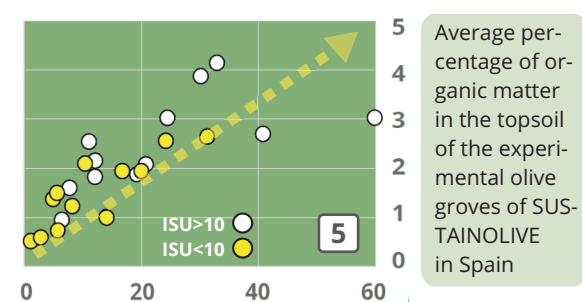
The highly significant positive correlation between the amounts of organic nitrogen and organic matter in the topsoil (graph 2) indicates that soil nitrogen reserve depends on the contribution of organic residues that farmers can do.

THE AVAILABLE NITROGEN



Some variables related to the nitrogen cycle in the soils of the experimental olive groves of SUSTAINOLIVE in Spain. Data have been weighted to the value of 1 assigned to the variables with the highest values: forest for graph 3 and olive groves with a sustainability index (ISU) above 10 for graph 4.

Mineralizable nitrogen
Nitrification capacity



Average nitrification capacity in the soils of the experimental olive groves of SUSTAINOLIVE in Spain (micrograms of nitrogen produced by the microflora of one gram of soil during 5 hours).

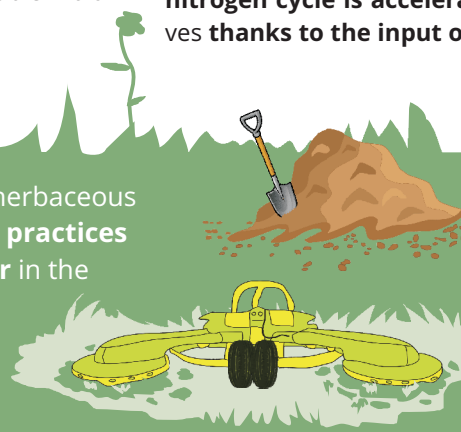
REMEMBER THAT...

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

The topsoils of olive groves where sustainable management practices were applied showed **a much higher amount of mineralizable nitrogen and nitrification capacity** than those olive groves managed conventionally, respectively of 31% and 18%. Despite of this, the most sustainable olive groves have a wide margin of improvement until reaching the levels of mineralizable nitrogen measured in the adjacent forest patches (graph 3).

Indeed, **the lower the sustainability index, the lower the two indicators of nitrogen availability** (66% less for mineralizable nitrogen and 47% less for nitrification capacity, as shown in graph 4). The high positive correlation between the percentage of organic matter and the nitrification capacity measured at the topsoil demonstrates once again how **the nitrogen cycle is accelerated** in the soil of our experimental olive groves **thanks to the input of organic matter** (graph 5).

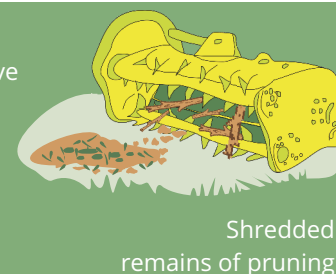
the maintenance, favoring or planting of a herbaceous cover crop, as well as any other **agronomic practices that improve the levels of organic matter** in the topsoil of the olive grove, promote the **retention of nitrogen** (along with other nutrients), avoiding it is lost due to surface runoff, washing or erosion.



KEEP IN MIND THAT...

Manure or composted olive mill pomaces

Remains of cover crop clearing



Shredded remains of pruning