



SCIENCE FOR ENVIRONMENT POLICY

Cover cropping improves soil health and reduces weeds, finds Mediterranean orchard study



3rd November 2020 /
Issue 551

**Subscribe to free
bi-weekly News Alert.**

Source:

Scavo, A., Restuccia, A., Lombardo, S., Fontanazza, S., Abbate, C., Pandino, G., Anastasi, U., Onofri, A. and Mauromicale, G. (2020) Improving soil health, weed management and nitrogen dynamics by *Trifolium subterraneum* cover cropping. *Agronomy for Sustainable Development*, 40(3).

Contact:

cristina.abbate@unict.it

Mediterranean agroecosystems¹ with low rainfall suffer from depleted soil quality due to low levels of nitrogen and organic matter. This is especially true in fruit orchards, where farmers use tillage and herbicides to manage weeds and soil moisture loss. Sustainable practices to reduce biodiversity loss and improve soil quality are needed. This study investigates cover cropping combined with mulching as an organic, sustainable way to improve soil quality and manage weeds.

In past decades, the intensification of agriculture and increased use of agrochemicals has negatively impacted ecosystems across Europe, causing the loss of soil organic matter (SOM) and biodiversity, nitrate leaching and soil erosion. The Mediterranean Basin is particularly prone to these effects, with low rainfall and high summer temperatures contributing to SOM loss, and farm ecosystems experiencing low soil quality and high weed pressure.

To address such issues, scientists and policymakers are seeking alternative sustainable management practices. In Europe, the use of sustainable organic methods in farming is encouraged under the seven [United Nations sustainable development goals \(SDGs\)](#) that encompass soil health, including SDGs 2, 3, 6, 11, 12, 13 and 15. This study investigated a potential sustainable management method for organic farms: the use of a herbaceous species of clover, *Trifolium subterraneum*, as a cover crop, either with or without burying dead mulch into soil (mulching).

The researchers evaluated the efficacy of this method in a Sicilian apricot orchard over a time period of three years, assessing the resulting nitrogen dynamics and presence of weeds, and using a conventional farming approach as a comparison (four rounds of ploughing spread across the year). They recorded the quantities of nitrates, ammonia and total nitrogen in soil samples from the test plots and quantified the presence of the bacteria *Nitrosomonas europaea* and *Azotobacter vinelandii* (involved in the soil nitrogen cycle).

T. subterraneum cover cropping, with or without burying dead mulch into the soil, reduced the number of weed species and quantity of weeds by 70% compared to conventional farming methods. This approach also increased the soil quality in the orchard, the number of beneficial bacteria present — a 109% rise in *N. europaea* and 145% rise in *A. vinelandii* — and observed levels of ammonia (+137%) and nitrates (+478%).



SCIENCE FOR ENVIRONMENT POLICY

Cover cropping improves soil health and reduces weeds, finds Mediterranean orchard study (continued)

Read more about:

[Agriculture, Soil, Sustainable consumption and production](#)

The contents and views included in Science for Environment Policy are based on independent, peer-reviewed research and do not necessarily reflect the position of the European Commission. Please note that this article is a summary of only one study. Other studies may come to other conclusions.

To cite this article/service:

[“Science for Environment Policy”](#):

European Commission DG Environment News Alert Service, edited by SCU, The University of the West of England, Bristol..

Subscribe to free bi-weekly News Alert.

The approach of cover cropping with *T. subterraneum* — conferred a major improvement in soil quality and weed control in a low-input organic Sicilian apricot orchard. This eco-friendly approach, if adopted by Mediterranean orchard farmers, would reduce synthetic herbicide use and inorganic fertilisers as the sole source of nitrogen supply in the Mediterranean area, and would have a lower impact on the environment than some conventional practices. The researchers identify a need for further research on the mechanisms involved in weed control and the plant-microorganism interactions of *T. subterraneum*, as well as on how clover cover cropping affects the chemical characteristics of the soil and the mineral status of the growing plants.

1. A spatially and functionally coherent unit of agricultural activity. Agroecosystems mark where agricultural activity (production, transportation, nutrition, security) intersect with ecological systems, from managed forests and orchards to pastures, croplands, and the organisms living within them (cultivated or otherwise).

