



Tropentag, September 11-13, 2024, hybrid conference

“Exploring opportunities ...  
for managing natural resources and a better life for all”

## No-tillage and cover crop practices for the agroecological transition of rainfed Tunisian olive groves

OLFA BOUSSADIA<sup>1</sup>, HATEM ZGALLAI<sup>2</sup>, AMEL BEN HAMOUDA<sup>1</sup>, MARIUS HOBART<sup>3</sup>, PIERRE  
ELLSSEL<sup>4</sup>, STÉPHANIE SAUSSURE<sup>5</sup>

<sup>1</sup>*Olive Institute (IO), Tunisia*

<sup>2</sup>*National Institute for Agronomic Research (INRAT), Tunisia*

<sup>3</sup>*Leibniz Inst. for Agricultural Engineering and Bioeconomy (ATB), Agromechatronics, Germany*

<sup>4</sup>*BOKU University, Dept. of Crop Sciences, Austria*

<sup>5</sup>*Natural Resources Institute Finland (LUKE), Finland*

### Abstract

Climate change, severe soil degradation and low soil fertility, exacerbated by inappropriate agronomic systems, have led to unbalanced, less resilient and increasingly unsustainable farming systems in North Africa. This has had serious consequences in socio-economic and environmental terms. In order to address these problems and to improve the agronomic performance of olive groves, we tested the effect of different agricultural soil management practices (tillage, no-tillage and cover crops) on soil properties, olive tree nutrient dynamics and olive/oil production. The study is carried out at two experimental sites (Toukaber 36°42'22"N 9°30'38"E, Beja Governorate, and Jammel 35°38'27.5"N 10°41'24.2"E, Monastir Governorate, Tunisia) during the cropping seasons of 2022 and 2023 ('on' and 'off' years). The sites have been selected according to the rainfall gradient (500 mm to 300 mm). The experimental design followed a Randomised Complete Block Design (RCBD) with four treatments (tillage, no tillage, favabean intercropping and fenugreek intercropping) for both sites and three and five replications in Toukaber and Jammel, respectively. The main results showed that, under rain-fed conditions, the absence of tillage and the intercropping with leguminous crops increase the organic matter (OM) and nitrogen (N) content of the soil. In addition, intercropping can be an essential component to improve the nitrogen nutrition of olive trees by increasing the leaf nitrogen (leaf N) content. Either by increasing OM or by improving soil and leaf N, olive yield was significantly improved. It can be concluded that the tested agroecological practices showed an improvement in soil fertility parameters and olive productivity, but it is important to note that no tillage and the choice of cover crop need to be carefully selected according to soil type and the local rainfall.

**Keywords:** Cover crop, leaf nitrogen, no tillage, organic matter, Tunisia