



## **Evaluation of pre-crops and organic fertilization program on the subsequent crop under Mediterranean conditions: case of South of Italy**

Ziad Al Chami (1), Amine Hmid (2,1), Damla Baysal (1), Nasser Amer (1,3), Lina Al Bitar (1), and Uygun Aksoy (4)

(1) Mediterranean Agronomic Institute of Bari – CIHEAM, Valenzano, Italy, via Ceglie 9, 70010 Valenzano (Bari), Italy, (2) Department of Environmental Sciences, Parthenope University of Naples, Centro Direzionale di Napoli - Isola C4, 80143 Napoli, Italy, (3) Swaida Research Center. General Commission for Scientific Agricultural Research – GCSAR, Swaida, Syria, (4) University of Ege, Faculty of Agriculture, Horticulture Department, 35100 Bornova (Izmir) Turkey

Organic farming systems rely on soil fertility management to enhance the soil chemical properties for the optimization of crop production and increase food quality. Soil fertility-building crops have been reported as a way to reduce inputs of fertilizers, improve soil fertility and increase the subsequent crop yield.

A four-year rotation programme was launched by the Mediterranean Agronomic Institute of Bari that aims at identifying the most suitable fertilization strategy in organic farming for Mediterranean countries under the prevailing conditions. The present study was conducted in southern Italy and it consists in evaluating the effects of pre-crops (faba bean, vetch and broccoli) in comparison to a fallow test on the subsequent crop (zucchini, tomato, lettuce and radish) in four consecutive years. Vetch and faba bean were able to satisfy the nutrient requirement of the main crop without any compost application; while commercial compost was applied to broccoli and fallow treatments prior to transplanting the main crop.

The main soil chemical parameters: organic carbon, total nitrogen, available phosphorus, and exchangeable potassium were improved over four years experiment. The trend was consistent; all main chemical parameters displayed a significant increase in all treatments, while no significant differences were obtained between treatments.

Based on the results obtained in the first two years, the effect of different pre-crops and fertilizers on zucchini and organic tomato qualitative and quantitative parameters were not significant. While the results obtained in the third and fourth years showed that pre-crops and fertilizers had significant effects on lettuce and radish yield and quality. Low nitrate contents were found in fallow and broccoli treatments (70 to 80% lower) in comparison to Vetch and Faba bean treatments and the ascorbic acid contents were (20 to 40% higher) after broccoli and fallow treatments. The low nitrate content in broccoli and fallow treatment can be due to the compost application rich in humified organic matter. Humified organic matter breaks down very slowly in the soil releasing gradually nutrients. Whereas, the high amount of fresh organic matter incorporated with vetch and faba bean may break down quickly in comparison to compost, releasing a flush of nutrients for plant growth. Additionally, nutrient accumulation such as nitrate can lead in a decrease in the vitamin C content. These suggest that the pre-crops, especially vetch and faba bean, can improve main crop yields; while compost improves the quality parameters.