

Olive Root Growth with Different Kinds of Organic Matter

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Abstract

*Plant root system plays a fundamental role in plant growth, since the “hidden half” represents a consistent part of the plant system, in terms of both biomass and functionality. In particular, with organic methods, crop quality and productivity strongly rely on effective soil–plant relationships as mediated by organic matter and soil biological activity. The addition of organic residues from plant and/or animal origin represents in organic and biodynamic farming the basic practice for enhancing overall soil fertility, thereby greatly influencing root development. Organic residues in the soil are degraded by soil microorganisms, and during this decomposition some metabolic compounds can become toxic for plants. The degree and duration of the toxic effect depend on the nature of the original matter (composition and physical properties). The objective of our experimental work is to investigate the response of plant roots in terms of growth and distribution to the presence of different kinds of organic matter. Olive husks and dried grass residues were used in several trials in order to observe root behavior of a perennial fruit crop (*Olea europaea* L.), which shows an outstanding plasticity to environmental conditions. Different root investigation techniques were used. In a first experiment, olive plants were grown in split-root pots in which the root systems were divided into four sectors and grown on different substrates. Husks, dried grass, and a mix of the two were added to a base substrate, to simulate husks amendment in an olive orchard with green mulching. Each root system, exploring different substrates, reacted with a differential growth and distribution of single roots. The same substrates were tested in a second experiment in bench rhizotrones. In this technique, plants were grown in Plexiglas transparent boxes 2 cm-thick, slanted 30° from vertical, in order to be able to observe and measure root growth. Finally, biodynamic preparations are being tested in the field and with bioassay (test Cress), to verify their potential effects when used in different concentrations.*

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