

Impact of HydroPolymers on the soil biological components in mediterranean drylands

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Soil degradation affects more than 52 million ha of land in counties of the European Union. This problem is particularly serious in Mediterranean areas, where the effects of anthropogenic activities (tillage on slopes, deforestation, and pasture production) add to problems caused by prolonged periods of drought and intense and irregular rainfall.

Soil microbiota can be used as an indicator of the soil healthy in degraded areas. This is because soil microbiota participates in the cycle elements and in the organic matter decomposition. All this helps to the young plants establishment and in long term protect the soils against the erosion. During dry periods in the Mediterranean areas, the lack of water entering the soil matrix leads to a loss of soil microbiological activity and it turns into a lower soil production capabilities.

Under these conditions, the aim of this study was to evaluate the positive effect on soil biological components produced by an hydro absorbent polymer (Terracottem).

The aim of the experiment was to evaluate the impact assessment of an hydropolymer (Terracottem) on the soil biological components.

An experimental flowerpot layout was established in June 2015 and 12 variants with different amount of Terracottem were applied as follow: i) 3.0 kg.m³ ; ii) 1.5 kg.m³ and; iii) 0 kg.m³. In all the variants were tested the further additives: a) 1% of glucose, b) 50 kg N.ha⁻¹ of Mineral nitrogen, c) 1% of Glucose + 50 kg N.ha⁻¹ of Mineral nitrogen d) control (no additive). According to natural conditions, humidity have been kept at 15% in all the variants.

During four weeks, mineral nitrogen leaching and soil respiration have been measured in each flowerplot. Respiration has been quantified four times every time while moistening containers and alkaline soda lime has been used as a sorbent. The amount of CO₂ increase has been measured with the sorbent. Leaching of mineral nitrogen has been quantified by ion exchange resins (IER). IER pouches have been placed on the bottom of each container, and after completion of the experiment mineral nitrogen leaching has been evaluated by distillation and titration method.

Results from respiration have shown statistically significant differences between the variants. According to control, soil with polymers have shown significant difference when comparing respiration with independence of the additive used. CO₂ production in the first week has exceeded the sum of the outputs of the following weeks. Mineral nitrogen leaching measurement has shown statistically significant differences. The lowest leaching has been occurred in control variant, while the highest in variant containing only the addition of mineral nitrogen.

Research results may conclude that the biological part of the test soil is not limited by a lack of components, the only thing that suppresses its activity is the lack of moisture. After moistening it leads to a rapid growth of soil activity, without causing the nutrients loss. Besides, Terracottem has affected soil activity neither positively nor negatively, but it considers being a suitable tool for reducing the drought impact in arid and semi-arid areas.