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Annual Legume Cover Crops Enhance The Sustainability of Rainfed Olive Orchards: From Leaf Ionome to Tree Physiology

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The olive sector has an important economic, social, cultural and ecological relevance in the Mediterranean region, where tillage and herbicides application still are generalized practices, although the recommendations of UE policy for a more sustainable agriculture. Cover crops with self-reseeding legumes of short-cycle, with mulch of dead vegetation during the dry season, is our option for soil management in olive tree rainfed orchards, as they provide protection against erosion, improve the physical and chemical properties, nitrogen fixation and soil moisture, enhance biodiversity and landscape beautification, while contribute to mitigation and adaptation to climate change and enable the organic production mode. The experiment was carried out during 2016 and 2017 on a commercial orchard (cv. Cobrançosa) in Northeast Portugal. The treatments laid out were: (1) ordinary tillage techniques used by local growers (two tillage trips per year) and (2) a mixture of 11 self-reseeding annual legumes (AL). The results revealed that cover crops influence positively the tree water status during the drought season, as well the nutritional status, namely the foliar concentrations of nitrogen, magnesium and manganese, both during the winter resting period and in summer, at endocarp sclerification. As a result, AL trees presented greater physiological performance during the summer, as evidenced by higher net photosynthetic rate, mainly due to inferior stomatal limitations, lower investment of resources in defensive metabolites, and enhanced yield. These results indicate that cover cropping should be included in the portfolio of adaptive management strategies against climate change, contributing to the sustainability of rainfed orchards.

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Determination of Ca2+ Absorption Rate of Young Rose Plants Grown in Hydroponic System

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During this work, experiments were conducted to determine Ca^{2+} absorption in relation to transpiration rate of young rose plants growing in closed hydroponic system. For these reason 96 rose plants (*Rosa hybrida* L. cv. Iceberg) were installed in a closed hydroponic system following the Deep Flow Technique. After a period of twenty days from the planting, the pH of the nutrient solution, the Ca^{2+} concentration in the different plant organs (roots, shoots and leaves) and in the nutrient solutions, as well as plants transpiration, were measured every 24 h for a period of seventeen days. The results of these experiments reviled a correlation between the transpiration rate and leaves Ca^{2+} content (% dry weight), as well as Ca^{2+} increment in the entire plant. The equations describing the above mentioned correlations were included in an empirical model to predict the concentration of Ca^{2+} in the recycled nutrient solution of the soilless culture (R^2=0.97). This method can be used to assess the adequacy of calcium in a nutrient solution used for the irrigation of a rose crop established in closed hydroponic system.

Influence Of Forced Aeration Rates On Maturation Of Composting Poultry Manure And Wood Shavings In Closed Reactor System

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The poultry industry is growing in South Korea, but there are problems associated with the management of poultry manure, and composting is one solution that could be valuable for crops and forage if managed properly. For achieving successful compost, aeration rate must be optimized to provide favorable condition for composting process. We investigate physicochemical properties i.e. Temperature, pH, EC, organic matter and seed germination index, in the composting of poultry manure with wood shavings under different aeration rates in closed reactor system. Three cylindrical reactors with total volume 60 L were used in this experiment. The aeration rates in 3 reactors were 0.25, 0.50 and 0.75 L/min kg OM. All parameters were monitored over 30 days of composting. The highest temperature in each treatment was 56.9, 55.8 and 48.1 C for 0.25, 0.50 and 0.75 L/min kg OM, respectively, appearing on the 3rd day at center of compost. Aeration rate of 0.25 L/min kg OM corresponded to a higher and longer thermophilic phase than other two reactors which had aeration rate of 0.50 and 0.75 L/min kg OM. The maximum organic matter degradation accrued with 0.25 L/min kg OM of aeration rate which provided adequate oxygen concentration for microorganisms. With 0.75 L/min kg OM of aeration rate lowest GI were recorded at day 30, suggesting severe phytotoxicity in the substrate. In all 3 reactors, aeration rate of 0.25 L/min kg OM provided most favorable condition for composting poultry manure with wood shavings in closed reactor system.

The Spreadwise System For Predicting Spread Patterns Of Centrifugal Fertilizer Spreaders

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