Influence of effective microorganisms and green manure on soil properties and productivity of pearl millet and alfalfa grown on sandy loam in Saudi Arabia.

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Abstract:

A field experiment was conducted to study the effect of effective microorganisms and green manure on soil properties and yield of pearl millet (Pennisetum glaucum (L.) R. Br.) and alfalfa (Medicago sativa L.) grown on sandy loam soil under arid conditions at Agriculture Experimental Station of King Abdulaziz University (KAU), Hada Alsham, Saudi Arabia. Four treatments were investigated. In control (T1), the soil was only treated with the recommended dose of mineral fertilizers required for the cultivated crops. The second treatment (T2) was a diluted solution (1:1000) of effective microorganisms (EM1) sprayed on the soil surface. The third treatment (T3) was green manure added as soil mulch above the ground while the fourth treatment (T4) was mixture of EM1 and green manure together. Results indicated that, EM1 and green manure improved forage yield and soil properties. The best improvement in yield was found in T4 and T3 of alfalfa and pearl millet fields, respectively. These treatments resulted also in the great reduction in soil bulk density and saturated hydraulic conductivity, high water retention and soil organic matter. Total nitrogen, phosphorus, potassium, iron and magnesium were also increased under these treatments. Little enhancement in physical and chemical properties of soil was pronounced in T2 treatment since the improvements were not significant compared with the control. The results suggested that using green manure alone or mixed with EM1 is a practical method to enhance soil properties and productivity of coarse texture soils under dry land conditions.

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