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Changes of microbial activities and soil aggregation in rhizosphere soil of lettuce plants by drought and the possible influence of inoculation with AM fungi and/or PGPR

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The effect of different arbuscular mycorrhizal (AM) fungi, Glomus intraradices (Schenk & Smith) or Glomus mosseae (Nicol & Gerd.) Gerd. & Trappe, and plant growth-promoting rhizobacteria (PGPR) (Pseudomonas mendocina Palleroni), alone or in combination, on structural stability and microbial activity in the rhizosphere soil of Lactuca sativa L. was assessed under well-watered conditions and two levels of drought. Desiccation caused an increase in aggregate stability and water-soluble and total carbohydrates but there were no significant differences among treated soils and the control soil. The glomalin-related soil protein (GRSP) levels in both the <2 mm and 0.2-4 mm soil fractions increased with medium water stress, whereas under severe water stress they did not differ with respect to those of well-watered soils. The values of GRSP in soils inoculated with PGPR and AM fungi were higher than in the control or fertilised soil under well-watered and severe-drought conditions, while under medium-drought conditions all soils showed similar GRSP values. Soils inoculated with AM fungi and PGPR generally presented higher dehydrogenase and phosphatase activities than the control soil, independent of the water regime.