



## **Soil bacterial diversity changes in response to agricultural land use in semi-arid soils**

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Natural scrublands in semi-arid deserts are increasingly being converted into agricultural lands. The long-term effect of such a transition in land use on soil bacterial communities was explored at two sites typical of semi-arid deserts in Mexico (Baja California). Comparisons were made between soil samples from alfalfa fields and the adjacent scrublands by two complementary methods - denaturing gradient gel electrophoresis (DGGE) and PhyloChip hybridization –employed to analyze 16S rRNA gene fragments amplified from total community DNA. DGGE analyses revealed significant effects of the transition on community composition of Bacteria, Actinobacteria, Alpha- and Betaproteobacteria at both sites. PhyloChip hybridization analysis uncovered that the transition negatively affected taxa such as Acidobacteria, Chloroflexi, Acidimicrobiales, Rubrobacterales, Deltaproteobacteria and Clostridia, while Alpha-, Beta- and Gammaproteobacteria, Bacteroidetes and Actinobacteria increased in abundance. The arable soils were lower in organic matter and phosphate concentration, and higher in salinity. Soil parameters that differed between land uses were highly correlated with the community composition of taxa responding to land use. Variation in the bacterial community composition was higher in soils from scrubland than from agriculture, as revealed by DGGE and PhyloChip analyses. The long term use for agriculture resulted in profound changes in the bacterial community composition and physicochemical characteristics of former scrublands, which may affect various soil ecosystem functions.