

Do bacterial and fungal communities in soils of the Bolivian Altiplano change under shorter fallow periods?

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Traditional fallow periods in the Bolivian highlands are being shortened in an effort to increase short-term crop yields, with potential long-term impacts on soil microbial communities and their functions. In addition, native vegetation, such as *Parasthrephia* sp. or *Baccharis* sp. (both locally known as 'thola') are often removed as a fuel for cooking. We evaluated the effects of fallow period and thola on soils in 29 farmers' fields in two municipalities in the Bolivian Altiplano (Umala and Ancoraimes). Soil fungal and bacterial community responses were characterized using 454-pyrosequencing. Soils in Ancoraimes had significantly higher levels of organic matter, nitrogen and other macronutrients compared to Umala. Ancoraimes soils also supported more diverse fungal communities, whereas Umala had more diverse bacterial communities. Unexpectedly, the longer fallow periods were associated with significantly lower fungal diversity in Umala and lower bacterial diversity in Ancoraimes. Fungi assigned to genera *Bionectria*, *Didymella*, and *Alternaria*, and bacteria assigned to genera *Paenibacillus*, *Segetibacter*, and *Modestobacter* decreased in frequency with longer fallow period. The presence of thola was not associated with significantly different overall soil fungal or bacterial diversity, but was associated with higher frequency of some genera, such as *Fusarium* and *Bradyrhizobium*. Our results indicate that fallow period has a range of effects on soil communities, and that the removal of thola may impact the dynamics of these communities.