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Changes in soil bacterial communities induced by the invasive plant Pennisetum setaceum in a semiarid environment

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Invasive alien species are considered as a global threat being among the main causes of biodiversity loss. Plant invasions have been extensively studied from different disciplines with the purpose of identifying predictor traits of invasiveness and finding solutions. However, less is known about the implication of the rhizosphere microbiota in these processes, even when it is well known the importance of the interaction between plant rhizosphere and microbial communities. The objective of this study was to determine whether native and invasive plants support different bacterial communities in their rhizospheres and whether there are bacterial indicator species that might be contributing to the invasion process of these ecosystems. We carried out a study in five independent locations under Mediterranean semiarid conditions, where the native Hyparrhenia hirta is being displaced by Pennisetum setaceum, an aggressive invasive Poaceae and soil bacterial communities were amplified and 454-pyrosequenced. Changes in the composition and structure of the bacterial communities, owing to the invasive status of the plant, were detected when the richness and alpha-diversity estimators were calculated as well as when we analyzed the PCoA axes scores. The Indicator Species Analysis results showed a higher number of indicators for invaded communities at all studied taxonomic levels. In conclusion, the effect of the invasiveness and its interaction with the soil location has promoted shifts in the rhizosphere bacterial communities which might be facilitating the invader success in these ecosystems.