Revealing interrelationship between invasive plants and soil bacteria and fungi as the base for habitat restoration after invaders removal

Plant invasions are an important problem of human-induced changes at a global scale, known to pose major threats to biodiversity, ecosystem function, and global and local economies. Although we recognize that the influences of alien plants in invaded ranges are significant, our understanding of their mechanisms is limited. Furthermore, as organisms under impact of invaders that are easily visible and easy to count have been usually studied, soil microbes have been investigated less frequently. Therefore, there are gaps in knowledge concerning the impact of plant invasions on the soil environment. Moreover, the ecological impacts of most invasive plant species have not been studied, the investigations were restricted to field observations and focused on few types of impacts. Nevertheless, to understand the causes and consequences of plant species invasion, to manage invasions, protect biodiversity, and preserve ecosystem structure and functioning, it is important to elucidate the impacts of these species on different ecosystem components, including soil microbes. In the submitted project, we plan to fulfill gaps in knowledge proposing complex studies, applying both observational and manipulative methodology, revealing interrelationship between invasive plants and soil bacteria and fungi in field studies, a restoration experiment in the field, and a common garden-like pot experiment. Data from plant communities, soil microbiology and chemistry, as well as microclimatic metrics will be collected for three growing seasons allowing broad comparisons among measurements, habitats, and invasive species. Invader removal areas will also allow for quantification of legacy effects and their return rates, which will be monitored over time. Furthermore, we intend to test simple, inexpensive and eco-friendly techniques for restoration of habitats after invasive plant removal.