



INTER-AMERICAN INSTITUTE FOR GLOBAL CHANGE RESEARCH

Functional links of aboveground changes and belowground activity with land use (CRN2014)

Land use and cover change (LUCC) affects the ecological functions which soil microorganisms provide, and that, in turn, affects how they relate to plants. Microorganisms living in symbiosis with plants play an important role in sustaining agriculture and food security. This project looks at how soil microorganisms react to changes in climate and LUCC in different temperate and tropical ecosystems in the Americas.

Goals

- Test the hypothesis that the soil carbon sink and ecosystem resilience can be increased by managing a key group of soil microorganisms - arbuscular mycorrhizal fungi (AMF)
- Document how plant community structure and productivity are linked to AMF diversity and activity

First results

- One might expect that the biodiversity of below-ground fungi reacts only slowly to environmental change. However, DNA analysis of dominant AMF taxa has shown shifts in species abundance even between different seasons of the year.
- This change in diversity affects their function. Both the diversity and the symbiotic ability of AMF declined so much in warm and dry seasons that the symbiotic relationship between AMF and their host plant may have been lost.
- Thus, climate change may have significant below-ground effects, which may reduce the performance of the associated plants.
- In the páramos region, project researchers from Bolivia and Ecuador have been successful in using this knowledge to produce bio-fertilizers that increase growth of potatoes. Experiments with other crops are continuing.

Principal investigator and lead agency

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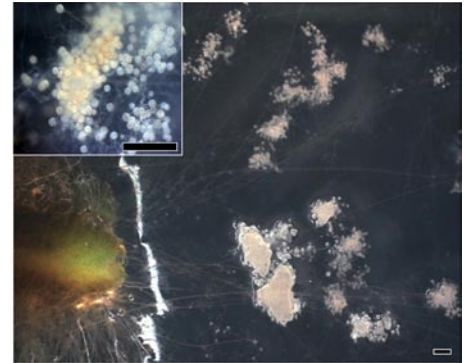
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Links to other IAI projects

CRN2014 and the **TROPIDRY** project (see CRN2021) have been collaborating in several joint sites and ecosystems, integrating above and belowground data.

Project web site: <http://www.ufrj.br/amfoods>

List of publications: <http://iaibr1.iai.int/bs?publications/CRN2014.pdf>



Mycorrhizae and bryophytes: an ancient plant-soil fungi association



Paramos (high altitude vegetation) in the Ecuadorian Andes



Mycorrhizae (white) explore soils and aid plant nutrition (Photo by D. Read)

