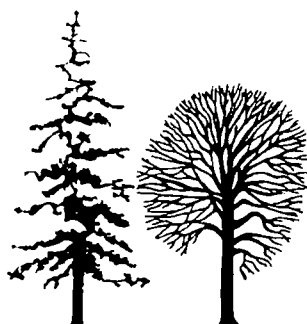


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**GOZDARSKI INŠTITUT SLOVENIJE**  
**SLOVENIAN FORESTRY INSTITUTE**

**Activity report for the bilateral project Brazil - Slovenia**  
**»Ectomycorrhizal fungi and oligochaeta diversity in Brazilian and**  
**Slovenian soils« No. 490648/2010-0 (CNP) (Brazil) / BI-BR/11-13-005**  
**(Slovenia)**

**Interim report upon the occasion of visit of the Brazilian partner at**  
**the Slovenian Forestry Institute,**  
**Ljubljana, Slovenia, 03.06.2013 – 14.06.2013**

Prof. Admir Jose Giachini

Dr. Tine Grebenc

Ljubljana, 14. 06. 2013

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## General Introduction



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The cooperative bilateral agreement signed between the Brazilian (CNPq) and the Slovenian (SRA) government has the primary goal of exchanging experiences among professionals in the fields of Mycorrhizae and Oligochaetas. In the broad sense, it brought together experienced professionals in these two fields, and opened possibilities for current and future scientific and professional collaborations between these two countries.

In that respect, both countries have sent professionals to visit their hosting collaborators in each country, giving them the possibility to get a touch on the projects that are under development, give insightful ideas for improving the development of these projects, cooperate in proposing creative ideas to solve unresolved problems or bottlenecks related to ongoing or to be set up projects, and last, but definitely not least, create the possibility to strengthen professional connections and proportionate the opening of a professional network between people that are directly and indirectly involved with this agreement.

One good example of this networking experience has come from the visit of Prof. Admir Jose Giachini, from the Universidade Federal de Santa Catarina, in Southern Brazil, who was in Slovenia from the 3rd to the 14th of June 2013. The primary goal of Professor's Giachini visit was to exchange ideas and discuss on relevant issues regarding projects and results in the field of Mycology and Mycorrhizae with Dr. Tine Grebenc, from the Slovenian Forestry Institute. Dr.'s Grebenc work has been crucial for the understanding of fungal community populations and the distribution patterns of mycorrhizal fungi associated with the forests in Eastern Europe. Dr. Grebenc not only has had many years of contribution in these fields, but has also gained a lot of experience and knowledge regarding issues that are directly related to the topics contemplated by this bilateral agreement.

In that respect, the visit of Prof. Giachini was almost entirely devoted to proportionate a solid first contact with the work that has been done in Slovenia by Dr. Grebenc and his collaborators. For a better structural presentation, this report will be divided into main areas and topics that have been either discussed in full or have been tentatively addressed during this visit.

## How the forests are perceived in Slovenia

The first impression about Slovenia was that it is covered in green, especially in this time of the year. Later on, I have found out that the country indeed is covered in green, and this comes from the roughly 60 % of overall forested land the country possess. This is really impressive, especially considering that some parts of Europe have been suffering from ongoing financial crisis. Therefore, cutting down the forest and selling its goods may seem like a very good alternative to be taken under such circumstances. However, what I have learned is that to the Slovenian people the forest is a refuge. It represents one of the most valuable items people possess. In fact, according to their beliefs, it should be the last item you trade in case unbearable conditions come along. Along with this belief comes a sense of respect and appreciation for the forest. The forest is a place to visit, to enjoy, and even to explore when the season brings about mushrooms or berries, for example. Man also explore it for wood, but on a very strict and well planned manner. Forest management allows for wood extraction in specific areas, always under strict technical supervision. It will never, however, consider nor tolerate clear cuttings, which, by itself, proportionate very specific conditions for the elements associated to a forested land.

That brings us into the next topic, which are the creatures that live in the forest, from large to small. If we start scratching around the forest, in particular the forest soil, we will come along the fungi, the earthworm, the bugs, and all other small creatures that are normally unseen or unknown to most people. The fungi alone are one of the most important living beings that a forest relies on for survival. Special groups of these fungi make mutualistic associations with many plant species, creating a new entity called mycorrhizae. The mycorrhizae are so important that some of these forests wouldn't even exist if it was not for the fungi that associate with the trees that form them. The literature is full of studies that show the positive long-term effects this association establishes to the involved partners and the surrounding ecosystem.

During the visit I was able to observe the large and intricate cooperation the fungi and almost all tree species have. In the sampling we have done in several of the locations we visited, it was quite obvious the roots were not alone. Fungi were covering them, showing the extension this network really plays. This was true for all the forests have visited, from North to South, including places such as alpine Pokljuka Plateau and Lipanca Mountain, the continental area virgin forest area of Rajhenavski Rog, sub Mediterranean type of low

production forest types on the limestone rich Karst plateau or the city (park) forest at Rožnik hill, next to the Slovenian Forestry Institute facilities.

### **Purposive sampling and projects**

During this period while in Slovenia I was able to participate in some of the field collecting excursions. Some were to collect soil samples for the analyses of ectomycorrhizae in different ecosystems. Others were to collect long term soil probe bags (in-growth soil cores or litter decomposition bags), which are meant to compile data on the behavior of some soil parameters and the effect of environmental factors in specific populations through time. I have also participated in a conifer shoot and needle collecting trip, which has the aim of detecting molecular level variations in the population of spruce in alpine regions. Finally, one last excursion was taken to collect earthworms from plots located at the Southern portion of the country. During all these visits we would invariably look around for signs of above and below ground fungi, and when found (not that often during this time of year), discuss about the generic classification, habitat and distribution, or any other important characteristic the species may had.

Besides these purposive samples, following specific methodologies, several field trips were done with the intention of getting familiar with distinct forest and landscape formation in Slovenia. Since the soil types in the country are well known, there are several phenomena of landscape formation that are unique to the region, like the depression and falls, the caves, the shallow soil covering bear rocks with a sedimentary or metamorphic origin, etc. All of these bear unique overall conditions regarding the populations of living species found in these niches.

### **Networking aiming at current or future collaborations**

During the stay at the Slovenian Forestry Institute I was able to visit and talk to several persons developing work in many different fields of expertise. Consequently, interdisciplinary brain storming brought about productive ideas in some of the issues I am currently facing in some of the experiments being developing in my laboratory back in

Brazil. Discussions with ecology oriented professionals resulted in ideas for more robust samplings. Conversation with lab technicians revealed practical ways to overcome simple, but sometimes complicated issues at the lab bench level. Hands on experiences suggested by professionals working with electronics have open a whole new sleuth of options on how to monitor sites and areas for very particular purposes. The employment of biological sensors as monitoring units for particular species of living beings (diversity studies), or for a particular condition of an ecosystem (climax, restoration, preservation, etc.) are very likely approaches that can be easily adopted if some determining conditions are set.

## **Conclusions**

After the time spent at the Slovenian Forestry Institute I am assertive to say that experiences like this ought to be more common between nations around the globe. Besides a privileged opportunity one has to interact with professionals from the same or adjacent fields, one also has the unique occasion to explore and immerse him or herself into the country's culture, sensibilities, issues, etc. It is a fantastic opportunity to strengthen the political and technological ties between nations and to collaborate for a better understanding of human kind, its origin, concepts, beliefs, etc.

In the end, I hope this was only the very beginning of a long lasting relationship between professionals in the field of Forestry, Mycology, Microbiology, Forest Ecology, Management, etc. between these two countries. The visit clearly indicated a high potential for a mutual experience sharing and learning among participating institutions and professionals and this will very likely come from future agreements made between both countries. This will bring about research opportunities to be developed between the nations, exchange of professional's experience and students, co-jointed publications, development of procedures and products, etc.

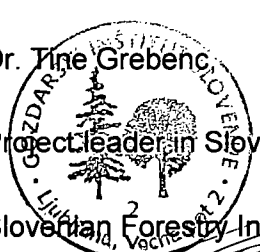
Opportunities like this are not to be taken for granted. Instead, they should inspire the team that has been participating in this experience to push governments and officials to create even more demands for more collaborative work. This could come in the form of specific demands for projects, money granted specifically intended to strengthen the partnership, etc.

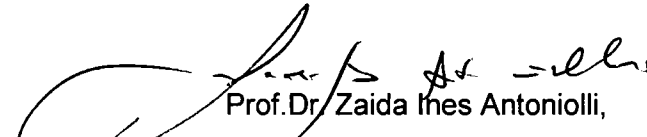
Prof. Admir Jose Giachini

Guest researches at the SFI

Universidade Federal de Santa Catarina

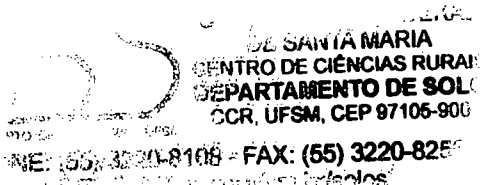
Dr. Tine Grebenc  
Project leader in Slovenia  
Slovenian Forestry Institute



  
Prof. Dr. Zaida Ines Antonioli,

Project leader in Brazil

Department of Soil, UFSM



Ljubljana, Slovenia, 14<sup>th</sup> June 2013.