

Eurolanet TNA Report

PROJECT LEADER

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COLLABORATORS

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Date of TNA visit:	15th-20th October 2010
Host laboratory:	Laboratory for Extremophily Centre for Astrobiology Madrid (Spain)

Project Title - The acidic and neutral counterparts within the terrestrial Fe cycle: processes, connections and microbial diversity.

Report on the outcomes of the TNA visit (approx 1 page)

The 5-day long visit consisted of two programs: a sampling campaign in Río Tinto area and a visit to the CAB facilities in Madrid to perform some lab work and scientific meetings.

15th October. Travel from Bergen (Norway) to Nerva (Río Tinto area, Spain).

16th-17th October. Visit and sampling to Río Tinto. We were looking for gradients or transitions between neutral/circumneutral low metal concentration waters to acidic, high dissolved metal concentration waters or vice versa. The aim is to get a glimpse into the diversity and abundance of microorganisms involved in the Fe cycle in these less acidic, low metal content waters and study the influence that these microbial communities might have in the Tinto system. The selection of sampling stations was based on some previous knowledge but we received good advice from our host. Several different sampling stations along Río Tinto course were visited and seven were selected for further sampling. The sampling procedure consisted of the following:

In situ geochemistry and data collection

- Geographic coordinates, temperature, pH, redox potential, conductivity and dissolved oxygen

Filtered chemistry

- 15 ml 0.2 um filtered water for anion analysis
- 15 ml 0.2 um filtered water for cation analysis

Unfiltered chemistry

- 50 ml water for DIC and TOC/DOC analysis

Biological samples

- 100 ml water 0,2 um filtered onto syringe and kept in RNA later for DNA extraction
- 10 ml sediment fixed with 4% paraformaldehyde
- 10 ml sediment in RNA later for DNA extraction
- 10 ml fresh sediment for enrichment
- 1.5 L water



The photo on the left shows a moment during the sampling in one of the stations in the headwaters area. The one on the right shows the interface between a neutral tributary joining to the course of the Tinto.

18th-19th October. Visit to the CAB facilities in Madrid. During this stay we had the chance to process the samples, do some filtering of the water and prepare the storage and shipment back to Bergen. The stay was also used to visit the labs and facilities and to discuss some aspects of this and some other future projects with our hosts.

20th October. Travel back to Bergen.

Please include:

- Publications arising/planned (include conference abstracts etc)

The relationship between the acidic and circumneutral iron cycles, especially in terrestrial environments is poorly understood. The occurrence of both counterparts within the same freshwater system is not frequent, therefore making Río Tinto a unique spot to study the connections between both. This is a provisional list of the type of research that we want to perform on the collected samples.

- Enrichment and isolation of Fe oxidizers on plates and gradient tubes.
- SEM analysis of the sediments in order to look for typical iron bioformations.
- Complete geochemical analysis.
- Diversity and phylogeny through the construction of 16S rRNA clone libraries.
- Quantify members of the Ferrovum/Gallionella group and total bacteria by qPCR with specific primers.
- PCR and phylogeny reconstruction (and/or qPCR for real time expression analysis) of functional markers of key metabolic processes.

The results will put some light on the diversity en ecology associated to this less acidic iron cycle in terrestrial fresh water systems and the relations and influence within the Tinto ecosystem. The work should provide enough information for at least a paper, which will be submitted to a dedicated journal on the field of microbial ecology. Moreover the work could also be part of a future presentation on the next Congress of European Microbiologist (FEMS) to be held in Geneva (Switzerland) in June 2011.

- Host approval The host is required to approve the report agreeing it is an accurate account of the research performed.