

## **Arkaroola Field Briefing – Boston, Spilde, McKay, et al.**

*Airport Stromatolite Site* – Near Airport, 20 km from Arkaroola on East side of road.

Stromatolites in narrow carbonate ridge, Vic pointed them out to us the previous day. They have beautiful structures visible in some faces. Significant small-scale karren weathering is present on a lot of the surfaces.

We noticed that there was also desert varnish on limey sandstone pieces in a very narrow, west dipping bed (~20° or less). The entire thickness was only 10 to 15 cm. Perhaps it was a storm surge or some other event may be recorded in this narrow band. The curious thing about this varnish was the distribution which seemed to be preferentially varnish on the west sides or westing sides of the upended pieces, but with significant lichen patchiness on the east and eastish sides.

A third item of interest at this site, is significant development of desert crust. We noticed this as a consequence of noticing first some striking pink lichen and then seeing that typical cryptogamic crust patches were present. Dark lichen of relatively low relief predominated the visible crust. Non-lichen covered areas did show some cohesion but unclear whether this is due to filaments or mineral precipitates.

We sampled the desert varnish for SEM, live cultures on a variety of growth media, and took a hand sample for chemical and other analyses.

We sampled the crust similarly and also took several hundred grams for Dr. Henry Sun, Desert Research Institute, Las Vegas, Nevada, USA, to add to his ongoing studies of desert biochemistry especially oxidants.

*Napouie Spring* - We found our way to Napouie Spring and a series of spring-fed pools, and the associated watercourse, Napouie Creek which was dry. This system is very slightly thermal at the source, approximately 28.5 °C at the source. The stream bed ran through some very striking stromatolitic limestone with large bioherm shapes visible weathering out at about a 10 to 15 ° dip. Precambrian limestone was primarily green in color but significant red and yellow alteration had occurred in sections of the visible outcrop. There was a quartz carbonate veining that crosscut the stream bed.

We did a filtration sample in the hopes of catching some interesting organisms and will plate out any captured organisms once we return to our lab. We also sampled a white precipitate that occurred at the margins of the pools and also appeared to be on the pebbles and possibly efflorescing from the sand on the stream bed that surrounded the pools.

In the lower pool, there was a very rapidly moving species of small fish. In addition, there was a single specimen of a larger and immobile fish with a dark tail. It appeared

to be the shape of a loach, namely long and fairly uniform in diameter.

### *Paralana Spring*

This radioactive and thermal spring (55.9oC) contains extensive and thick microbial mats that are forming primarily on the bottom of the pool of clear water. Mats are lifting off from the rock surfaces in many places, and a few pieces are floating. Further downstream from the pool source, the cooler waters support more surficial eukaryotic algae dominated surface mats.

We took a water filtrate to capture interesting organisms on a micropore filter for later analysis. We also took a series of samples from the mats themselves. Three samples were taken from a very hot area of the pool close to a rock from which gas was bubbling actively and which had a very cyanobacterial blue-green appearance. Three samples of mat were taken from slightly further away (2 meters) where fewer cyanobacteria were visible and the mats appeared more algal in nature.

The interior of the mat structure was complex and layered and the texture ranged from very fragile to rather tough and springy. We took a bulk sample of mat in pool water for biochemical and SEM analysis.