Nathan Reid

And the

Geobotanists Stone

Directed by Steve Hill

Nathan Reid and the Half-Baked Idea

 Map vegetation associations in the Tanami
 Establish whether the chemistry of vegetation reflects chemistry of the substrate

> Path-finder elements may be taken up with macro- or micronutrients

- 3. Determine if different species sample different depths within the substrate
- 4. Develop the application of vegetation sampling in mineral exploration (phyto-exploration) Provide economical and environmental alternatives to grid drilling

e.g. Drill holes cost up to \$200 /m

Sample Methodology

- Consistent media:
 - Same species, healthy, same age
 - Sample all round tree or shrub
 - Same sample size
- Avoid contamination
 - Plant selection
 - Latex and Nitrile gloves for each sample





Sample Preparation

- Brown paper bags for vegetation
- Powder-free Latex gloves
- Drying of samples: 50° C for 48 hours
- Grinding to fine powder
- Analysis: ICP-MS







Field Sites



CRCLEME

Adapted from AUSLIG 1990

Nathan Reid and the Goblet of Sampling

- February 2005 & January 2006
 - Coyote Prospect,
 Tanami
 - Transect 3 km long, 2x1.5 km transects
 - Species examinations
 - Geobotany



Geobotanical Study



Coyote Results: Snappy Gum



Interpretation

- Elements disperse from primary mineralisation
- Interaction with groundwater
- Percolation and inadvertent uptake
- Transport to surface organs





Coyote Results: Spinifex



Coyote Results: Spinifex



Titania Study

- October 2005
 - Titania Prospect,
 Tanami
 - 7x2 km
 Transects
 - Species
 sampling Geobotany





Conceptual Mineralisation Model Au As

Zn

S

spinifex

Image courtesy of S. Hill, L. Worrall, D. Kirste



Nathan Reid and the Order of the Paperbark Melaleuca lasiandra



Adapted from Moore 2005







Nathan Reid and the Deathly Wattles

Acacia bivenosa





Adapted from Moore 2005





Species Differences



-Colours

- 🛑 Acacia coriacea i
- 🔵 Melaleuca lasiandra
- 🛑 Triodia pungens
- 😑 Acacia bivenosa

Species Differences



Spinifex - Chromium Accumulator?

Titania



Laser Ablation



PIXE





Thanks for contributions from Rob Hough (CSIRO Perth)





Conclusions

- Snappy gum reflects structural features and hydrogeochemical signatures
- Spinifex able to detect mineralisation through 10s of metres of cover with multi-element suite
- Melaleuca similar patterns to spinifex but less widespread
- Acacia bivenosa able to detect drill spoil through cms of cover!!!
- Species differences are significant
- Metals highly concentrated at the tips of spinifex leaves



Nathan Reid and the Prisoner of the Tanami



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