SAVANNA LINKS

Cooperative Research Centre for the Sustainable Development of Tropical Savannas

ISSUE 5
MARCH 1998
ISSN 1327-788X

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CRC AUSTRALIA

Established and supported under the Australian Government's Cooperative Research Centres Program

Is El Nino relevant to the north?

In the middle of last year weather forecasters were predicting a late and "dry" wet season for the tropical savannas because of the El Nino phenomenon — so what went wrong? Parts of the Top End and Cape York Peninsula have had near record wet season rainfalls. Katherine, Normanton and Townsville all had serious flooding. Which raises an important question: should people in the top of Australia now view El Nino forecasts as having as much relevance to them as fortune cookie predictions? Well, the climate specialists say not necessarily, it just requires understanding the El Nino and discarding a few myths.

Photo: Greg Calvert

Surprise floods: Water rushing through Aplin's Weir in Townsville on January 11.

El Nino affects the whole of the country in the same way. According to the Bureau of Meteorology, an El Nino event actually affects different parts of the country more reliably at different times of year. In the north an El Nino is usually a good predictor of less rainfall in the build-up to the wet; in SW Western Australia it's normally a good predictor of a dry autumn. But these predictions are still only good for about 70 per cent of the time. Last year's build-up in northern Australia was one of those 30 per cent of cases where the El Nino prediction went astray — but it hasn't dented the confidence of the Bureau's climate researchers in the validity of their El Nino models.

This El Nino — 'the climate event of the century' — has been an over-hyped dud. When its global impact is taken into account this year's El Nino may live up to the hype; it has been more severe in some ways than the big one of 1982/83 which was the most intense so far this century. According to the US National Oceanic and Atmospheric Administration (NOAA) this year's event saw ocean temperatures in the Pacific reach record highs of 5 degrees above average. The El Nino also had a greater impact on atmospheric circulation than in 1982/83. There were severe storms and floods in North and South America, and drought in PNG and Indonesia.

The SOI Index sums up El Nino. The Southern Oscillation Index (SOI) is the difference between the standardised Tahiti Sea Level Pressure (SLP) and the standardised Darwin SLP. Although this difference reflects many of the broad changes in sea temperatures and atmospheric circulation that occur during an El Nino, it doesn't give the whole story. In the current El Nino the monthly SOI figures have not reached the low levels of 1982/83, yet changes in sea surface temperature and atmospheric circulation in the eastern Pacific have been more pronounced than in 1982/83.

The take-home message from the climate agencies? El Nino climate forecasts are a lot more useful than fortune cookies forecasts but it helps to put them in their proper context.

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News and views for northern Australia

Savanna Links is our newsletter for communication between and among all those interested in Tropical Savannas CRC.

We are determined to improve the effectiveness of communication with stakeholders and the participants of the Centre. This is essential if we are to be relevant and productive in helping savanna users, managers and owners in their quest for sustainable management and development.

We are improving our communication in a number of ways. Already we have held workshops for participants to define areas for collaborative work both mapping the tropical savannas and studying its landscape and functions.

A workshop is being held in March to decide how best to conduct our extension and training activities with the full range of our stakeholders. And we are also sponsoring the North Australian Fire Management Workshop, which more than 100 participants will attend.

We will be increasing the number and range of our publications. An easy-to-use booklet on fire management is proposed for use by savanna managers. Pamphlets on each of our projects, explaining their activities and relevance will be produced, as well as an occasional report series.

It is important that we better understand your views, attitudes, lines of communication and current practices in relation to sustainable savanna management. Officers from the Rural Extension Centre, Gatton, Queensland, who have considerable experience in this field, have begun a project to explore this area.

We are in the midst of improving our Web site to enable us to more efficiently store, assemble and compile our information for other means of communication. We are making use of CD-ROM as a means of providing information for training, education and general awareness.

Communication is a two-way street. Please have your say on issues you feel are important and in response to any matters you read about. *Savanna Links* is our newsletter, for all of us to use. I hope you enjoy this and future issues. I look forward to your contributions.

John Childs, Director.

Where and what are Australia's tropical savannas?

The tropical savannas are landscapes of dense grasses and scattered trees that stretch across northern Australia. The region dominates the top third of the country and is home to a rich variety of plants and animals. Industries in the region generate $7.5 billion in income yearly.

Tropical Savannas CRC was established in late 1995 and consists of a large number of partner agencies. We have more than 100 project staff based in centres including Darwin, Townsville, Kununurra, Katherine, Charters Towers, Cairns and Mareeba.

The shaded region represents the tropical savannas. CRC research takes place across the entire region.

We operate not only across the region, but across disciplines including ecology, biology, economics, information technology and social sciences. We aim to tackle gaps in savanna information and research for the region's stakeholders: the people who live and work in the tropical savannas.

Our partner agencies are:

- Agriculture WA
- Australian National University
- Conservation and Land Management WA
- CSIRO Land & Water, Tropical Agriculture, Wildlife & Ecology
- Department of Primary Industries, Queensland
- Department of Natural Resources, Queensland
- Environment Australia
- James Cook University
- NT Department of Lands, Planning & Environment
- NT Department of Mines & Energy
- NT Department of Primary Industry & Fisheries
- NT Power & Water Authority
- Northern Territory University
- Parks and Wildlife Commission of the NT.

SO_2 emissions from MIM's stack will be reduced by 2000. The CRC is involved in a study examining the effect of emissions on the surrounding environment. *Photo: Tony Griffiths*

Probe looks at long-term effects of sulphur dioxide

The impact on wildlife of sulphur dioxide (SO_2) emissions from one of the world's largest lead, copper and silver mines is the focus of a new study by Tropical Savannas CRC.

Mount Isa Mines (MIM), in remote northwest Queensland, produces approximately 700,000 tonnes of SO_2 each year, as a by-product of processing lead, silver, copper and zinc. MIM is committed to reducing these emissions, and has commissioned the new study.

According to CSIRO Wildlife & Ecology researcher, Tony Griffiths, prevailing winds disperse the SO_2 plume from the mine over a 10,000 square kilometre area (equivalent to the total Sydney metropolitan area) of savanna woodland northwest of Mount Isa.

"We are aiming to assess just what sort of long-term impact the SO_2 emissions are having on the biodiversity in the region", he said. "This is a unique opportunity to assess the impact of SO_2 on Australian plants and animals". Studies elsewhere in the world on the effects of sulphur dioxide have shown that plants are the most sensitive, followed by invertebrates, such as insects and spiders, which may be crucial to ecosystem health.

In an effort to reduce SO_2 emissions MIM, in collaboration with Western Mining Corporation, plans to install a sulphuric acid plant which will reduce SO_2 emissions by 80 per cent. The sulphuric acid will be processed into an agricultural fertiliser which will replace imports into Australia.

Tony says a number of benchmark sites have been established to allow assessment of biodiversity changes following the installation of the plant. He says this will allow Mount Isa Mines to continue monitoring the long-term environmental effects of reduced SO_2 emissions.

Further information: Tony Griffiths, CSIRO Darwin, Tel: (08) 8944 8424. Tim Hodge, Mount Isa Mines Tel: (07) 4744 2791.

Related information: If you're interested in environmental management of mines try *Groundwork*, a quarterly publication free from Australian Minerals & Energy Environment Foundation Tel: (03) 9679 9964.Email: mtameef@amira.com.au

Cyclone Trivia

From http://www.storm97.com

The first use of a proper name for a tropical cyclone was by an Australian forecaster early in this century. He named them "after political figures whom he disliked. By properly naming a cyclone, the weatherman could publicly describe a politician (who perhaps was not too generous with weather bureau appropriations) as 'causing great distress' or 'wandering aimlessly about the Pacific.'" *(Atlantic Hurricanes* (1960), G.E Dunn and B.I. Miller, Louisiana State Press.)

There is a set list of cyclone/hurricane/typhoon names for different parts of the world. In Australia there are different lists for the west, north and east Australian coasts that proceed in alphabetical order alternating between male and female names. The next cyclones from the east will be Nathan and Olinda.

Cyclone Tracy was one of the smallest on record, its gale force winds being restricted inside a circle of 50 km radius, tiny next to the largest cyclone on record: the 1979 Super Typhoon Tip of the Northwest Pacific which had a wind radius of 1100 km.

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Related Research: Mark Stafford Smith (CSIRO W&E, Alice Springs) and Andrew Ash (CSIRO TAG, Townsville) are looking at how feasible it is to use climate forecast information in grazing management.

Related Webwites: Qld's DNR and DPI "Long Paddock" site for SOI and ENSO information www.dnr.qld.gov.au/longpdk/ The Bureau of Meteorology's SILO site for agricultural information: www.bom.gov.au/silo/ and for El Nino – www.crh.noaa.gov/den/elnino.html

'Fire Stick Farmers' are killing Kakadu

David Barnett, *Financial Review*, Letters 22/1/98

Kakadu is unique in the world among wildlife parks. It has no mammals for people to look at. They come from all over the world, but what they get is second-best scenery, blazing heat, and perhaps a dip in a swimming hole adorned with warnings about crocodiles.

There are bears to see in Yellowstone. Wildebeest on the Serengeti are watched by lions and by tourists. In Kakadu, where the two most spectacular falls, Jim Jim and Twin Falls, have been closed off to visitors, along with ancient rock art, there is nothing to be seen that does not fly or swim. The fact is that Kakadu and the other parks under Aboriginal control are established as hunting preserves for Aborigines, whose right to live off the land takes precedence over conservation.

As a result, wildlife has either been eaten or become secretive. Wallaroos and the wallabies survive, hiding from the Aborigines, and thus from tourists. The echidnas feeding from the termite mounds bury themselves during the day in caves and under ledges. The Aborigines still find them, roll them in mud and throw them on fires. Even less fortunate are emus, which are really good eating and becoming rare, and the pig-faced turtle, which is at the point of extinction in Kakadu. Bustards are rare. There are no dugong left on the sea-grass beds around Tiwi. Turtles are endangered. However, these species still exist. They are thus better off than *palorchestes*, *zygomaturus*, the *diprotodons*, *procoptodon*, *simosthenurus*, *sthenurus*, *phascolonus* and *genyornis* — giant animals that browsed in the forests which once covered Australia.

Burning regimes, tree clearing, traditional and pastoral management of the land are just some of the issues that can cause substantial divisions in the community. Here we provide a forum for views, sometimes opposing, that need to be taken into account if we are to move forward to a sustainable future.

Their extinction at the hands of Aborigines after they arrived 40,000 years ago is described by Tim Flannery, of the Australian Museum of Sydney, in his book *The Future Eaters*. Some 60 species of large marsupials were killed off. The Aborigines destroyed with fire the rainforests which covered the continent, creating the open woodland of fire-resistant eucalypts and acacias which suits the bandicoots and other small marsupials which became the Aboriginal diet. It is a process that makes nonsense of rhetoric about harmony with the land and a special Aboriginal relationship with nature. Aborigines obliterated the flora and fauna, impoverishing the soil and desiccating the continent. Moreover, the process continues, dressed up for the consumption of other naïve Australians as 'fire-stick farming'.

The Northern Territory Government of Shane Stone is attempting to prevent further extinctions, on terms acceptable to Aborigines. It is endeavouring to give the force of law to vanishing tribal customs which put some limits on predation. Foreshadowing the legislation, the then conservation minister, Steve Hatton, told the Assembly a year ago: "People should be required to abide by the traditional law. If they do not, they are no different from anybody else." The legislation, which does not apply to Kakadu because it is under Commonwealth control, is now in draft form. *(This letter has been edited for reasons of space)*

Mr Barnett wrote *John Howard: Prime Minister.*

And in response . . .

Peter Cooke, Unpublished letter to *Financial Review*, late January.

Forward to which past?

David Barnett (*FR* 22/1/98 Fire-stick farmers are killing Kakadu) must have been most impressed by the Kakadu of 20 years ago when his boss Malcolm Fraser and Galarrwuy Yunupingu used to go fishing there together. What Kakadu lacked in the way of bears and wildebeest that Barnett implies are biological hallmarks of a world-class national park was no doubt compensated for by the feral and exotic water buffalo thronging swamp and forest in the 1970s. This might have been a sight to gladden the heart of a frustrated white hunter — but it was also an unmitigated ecological disaster which has since been turned around by the partnership of Aboriginal landowners and Australian National Parks and Wildlife Service staff.

David Barnett's vision that national parks are principally places to see mammals trampling the plains or bounding through the savanna woodland is a fairly primitive view of the role national parks play in our international commitment to the conservation of biodiversity. But that's just his opinion, to which he's entitled. But he is less entitled to opinions which reflect a failureto shift hypothesis from established fact and malignant misinformation from easily available data. His views on Aboriginal hunting and gathering practice are clearly not based on any original research and sound more like 'facts' gleaned second-hand from taxi drivers and grumpy old tour operators. For ex-

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Grazing trial aims to help with drought

A one thousand hectare chunk of typical Dalrymple Shire grazing country in north Queensland is being used in a new Department of Primary Industries grazing trial to develop and demonstrate strategies to help graziers cope with rainfall variability.

Led by Charters Towers Principal Scientist Peter O'Reagain and District Experimentalist John Bushell, the long-term trial is taking place on John and Ronda Lyons' *Wambiana Station*, 60km south-east of Charters Towers to assess and demonstrate the ability of different cattle stocking strategies to cope with rainfall variability.

The CRC provides funding for the project which has also received funding from the the Drought Regional Initiative, Natural Heritage Trust and the Great Barrier Reef Marine Park Authority. A different stocking strategy is being applied to 10 paddocks and their effects on animal production, pasture condition and long-term economic performance are being evaluated.

Peter O'Reagain said the inability of current grazing practices to cope with variable rainfall was probably the single biggest threat to the ecological and economic sustainability of the grazing industry in north Queensland.

"The trial will allow producers to objectively assess the relative costs and benefits of different management strategies which, once established, will be introduced to graziers through a major extension program," he said.

The project also wants to develop innovative new strategies to minimise drought loss by linking the latest advances in climate modelling with grazing management. For example, one of the strategies tested will involve a proactive adjustment of animal numbers before the 'wet' based on SOI or sea surface temperature based predictions for the coming season.

A grazier advisory committee has also been formed to advise on different aspects ranging from what strategies to test to what burning regime should be implemented.
John Lyons said he was happy to be associated with the trial.
"Whatever the outcome, all of us will have learnt a lot about our environment. And that can only make us better land managers."

Contact: Dr Peter O'Reagain; Tel: (07) 4787 2155; Fax: (07) 47874889. Email: ainp@dpi.qld.gov.au

Related Websites:
http://www.dpi.qld.gov.au/
http://www.dnr.qld.gov.au/longpdk/

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ample, he has mixed up the rare and rarely hunted pig-nosed turtle with the ubiquitous long-necked turtle of North Australia which is an Aboriginal staple and in no danger from hunting pressure.

With some evident glee he pounces on Flannery's controversial views of Aboriginal involvement in ancient megafaunal extinctions and links this to portrayal of modern Aborigines as irresponsible eco-vandals. Barnett might argue he's trying to balance up warm and fuzzy portrayals of ancient Aborigines as mystically wise proto-hippies but he might also consider that he is feeding the kind of racist thinking which has produced such deep humanist thought as "serves the Jews right, they killed Jesus anyway". Is John Howard waiting for Paddy Dodson to apologise for the megafauna before he'll say sorry to the Stolen Generation?

Flannery's hypotheses deserve to be taken seriously because of their burgeoning popular appeal — but there are other scientists with decades of experience, like David Bowman of the Tropical Savannas CRC, who assert that the scientific jury is still out on a number of questions about ancient Aborigines and hunting. These questions hang over hypotheses which assert both positive and negative outcomes from pre-historic Aboriginal management of the land. They need to be dealt with through a continuing rational examination of evidence — of contemporary Aboriginal fire management in areas where that is a continuing practice and in more general examination of the fossil record and climatic change, both before and since human occupation of Australia.

What we don't need is a double helping of half-baked misinformation, salted with a sympathetic scientific hypothesis and served up, as only an accomplished conservative spin doctor might, to suit the taste of a public wandering leaderless into moral and intellectual mire on the issue of race and decency.

Peter Cooke
Head of Caring forCountry Unit, Northern Land Council.

Related information: The NLC now has a land management lift-out section in its *Landrights News*.

Reptiles give new slant on conservation

Australia's reptiles aren't as tough as we thought — those are the findings of James Cook University student Nikki Thurgate who completed a Tropical Savannas CRC Honours scholarship at the end of last year. Nikki studied the impact on reptiles of cattle grazing at a unique Queensland location, the Great Basalt Wall, and found that grazing had seriously affected both the abundance and diversity of reptiles in the area. Nikki conducted studies comparing geckos, skinks and goannas between grazed and ungrazed sites north-west of Charters Towers.

Nikki Thurgate with one of her reptilian research subjects.

These sites are found within a natural barrier provided by Queensland's Great Basalt Wall — the result of a volcanic flow that probably took place 13,000 years ago. The lava flowed into low-lying areas leaving pockets of vegetation on higher ground but those pockets now lie lower than the basalt, effectively keeping out grazing animals such as cattle.

What she found was that there were almost twice as many individual animals in the ungrazed sites as in the grazed sites. Species diversity was also significantly higher in ungrazed sites. Assoc. Prof. Ross Alford, one of Nikki's supervisors, says the study could have implications for conservation managers throughout Australia's savannas.

"Essentially the thinking has been that if you keep grazing pressure to a moderate level, don't clear trees and don't defoliate then grazing would not have much effect on the native reptile fauna," he said. "This study suggests that grazing has stronger effects than previously realised.

"It's a very good study in that it compares completely ungrazed areas with grazed sites which is a difficult thing for people to do," he said.

Nikki worked in nine separate areas of habitat on two different properties and found 27 species of geckos, goannas, skinks and snakes. The four species that had suffered the greatest impact were the gecko *Gehyra catenata* and three skinks: *Morethia taeniopleura* (fire-tailed skink); *Ctenotus robustus* and *Carlia jarnoldae*. Of the fire-tailed skink, Nikki found 40 in ungrazed sites, and six on the grazed sites. *G. Catenata* was twice as abundant in the ungrazed areas compared to the grazed, and of the *C. Jarnoldae* 20 were found in ungrazed sites and two in the grazed areas.

Related Website:

The Australian Herpetological Directory on http://www.jcu.edu.au/dept/Zoology/herp/herp2.html

Three fat-tailed mice a find for Queensland

The state of Queensland is now the proud owner of a new mammal: the Fat-tailed Sandstone Antechinus. Tropical Savannas CRC researcher Tony Griffiths (CSIRO W&E) found the marsupial mouse far from its known habitat of central and western Australia during a recent fauna survey in the Mount Isa region for MIM. (See page 3.)

"These are the first records in Queensland of this species, and probably represent a range extension of 500 km," said Tony who found three juvenile mice (*Pseudantechinus macdonnellensis*) in blistering heat late November last year. One has since made a trip to Brisbane and is now a resident of the Queensland Museum.

Not a great deal is known about this marsupial except that like others of its ilk it uses its tail for storing food during good conditions, resulting in a swollen carrot-shaped tail.

By storing food in its tail the animal can gorge food in good conditions, allowing it a reserve to fall back on during the bad.

Both Tony and the museum scientists believe that the mouse has probably always been in Queensland. Tony explained that the research in the Mount Isa Region had generally been unsystematic and dispersed over a huge area.

Related information:

Around Mount Isa: A Guide to Flora and Fauna, Helen Horton, UQ Press 1976.

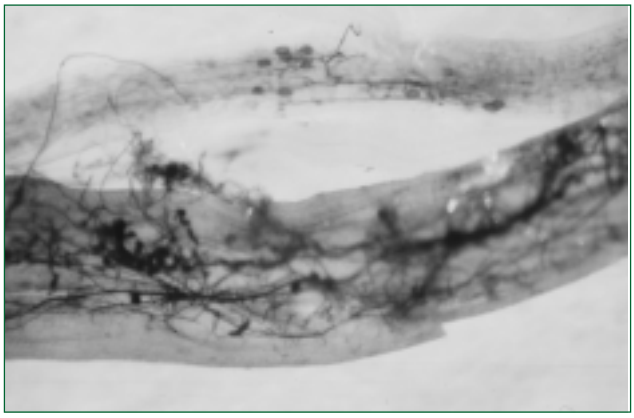
Get more from your grass: try an alien collaboration

Many native grasses in the tropical savannas thrive if given a dose of fertiliser ¾ but the same cannot be said for the cattle that feed on them: in some cases they can end up bloated. The suspected cause: visiting aliens.

The aliens in question are species of root-fungus (that go by the scientific term mycorrhizae) These fungi attach themselves to the root system of the grasses and create an extensive network of fine threads that extend into the soil — a web that helps the plant efficiently extract precious phosphate from the infertile tropical soil, while the fungi get energy from the plants (see box below).

The fact that many tropical grasses have a root fungus down below helping them with the phosphate gathering duties affects how they respond to fertiliser supplements. In soils that are higher in minerals, from being fertilised for example, many grasses will forego the nutrients they get from root-fungus. Why waste energy supporting a fungus when there's so much phosphate in the soil that you don't need the efficient phosphate extraction the fungus provides? However while the plant may be able to extract phosphate on its own in fertilised soils, it also grows more and the phosphate in a given weight of plant can drop. The phosphate can become "diluted". Thus in order to get the same dose of phosphate, cattle have to eat more grass in a paddock that gets phosphate from fertiliser compared to one that obtains it from the help of root-fungus. Hence the cattle can become bloated ¾ at least this is the mechanism that scientists like Dr David Janos (a recent CRC visiting scientist) suspect is at work.

The take-home message here is that it can pay to know more about the role that mycorrhyzae play in tropical pastures.



No, it's not a close-up of a hideous alien life form: it's an inside view of a eucalypt root showing the fine network of theads that extend into the soil helping the plant extract phosphate. *Photo: Felicity Adams*

Just what are mycorrhyzae?

Mycorrhizae is the name given to fungi associated with plant roots however, "associated" does not really convey the depth of the relationship.

Mycorrhyzal fungi infect the roots of many plants ¾ usually the tender young roots ¾ and enmesh them in a web of thin threads that extend into the soil; under an electron microscope it can look like the roots have become entangled in an untidy mass of fishing line.

The fungi get a considerable benefit from this: they take nutrients like sugars from the roots. Fungi, unlike plants cannot make their own nutrients. The plant, in turn, gains an extensive network of threads penetrating the soil that make an efficient way of absorbing water and essential ions. This is a remarkable "win-win" partnership for both fungus and plant, albeit not in the familiar heart-warming sense that gets good newspaper coverage and an interview with Ray Martin.

This is a pity for the tropical savannas because one of the best examples of how this fungus/plant relationship works is seen in tropical soils.

These soils are often low in essential ions like phosphate, and without their networks of efficient phosphate-absorbing mycorrhizae many plant communities could not survive in infertile tropical soils.

Warrior Fungi

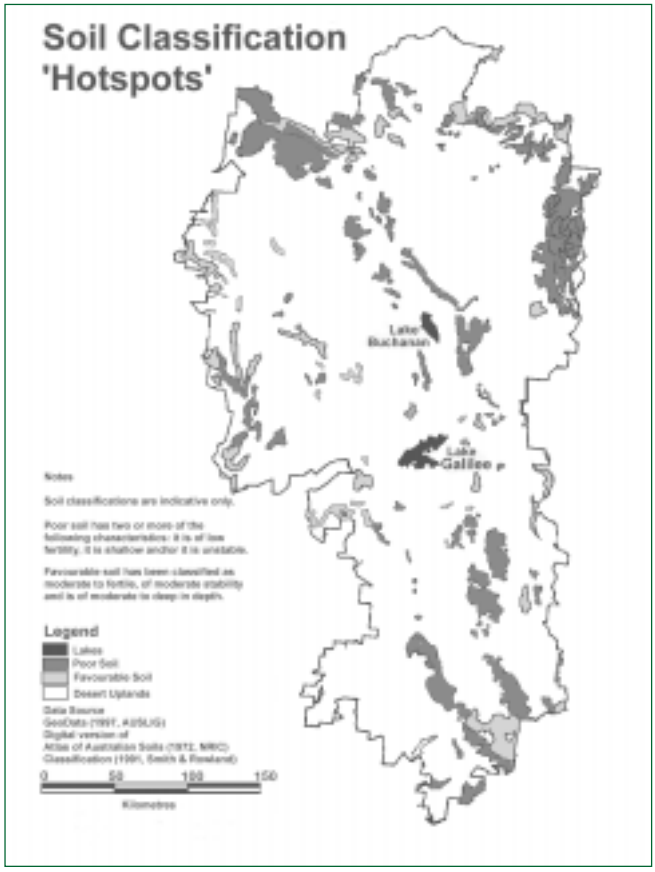
Mycorrhizae is a bastard of a word ¾ it has a mixed parentage from both Greek and Latin sources. "Myco" comes from the Greek for fungus; apparently because toadstools and mushrooms reminded the Greeks of the sword-handles of Mycanean culture. "Rrhizae" comes from the Latin word for root, hence we have a mongrel name that would sound pretty straightforward in English: "root-fungus".

These articles were based on interviews with Mycologist, Associate Professor David Janos from the University of Miami. Dr. Janos was a Tropical Savannas CRC visiting scientist in 1997. He can be contacted on davidjanos@miami.edu

GIS helps out with community land care

One of the most powerful tools in land management can be a GIS (Geographic Information System). It is created by entering data on soil types, property boundaries, drainage patterns etc. into a computer, this data can then be combined, manipulated and analysed to generate maps showing patterns and trends in any area.

While there might be whole sets of data for a region available, it can sometimes be difficult for interested landholders or community groups to get hold of them.



This map on soil hotspots shows some very broad soil classifications for the region— soils defined as poor here may well have fertile soils within the area.

The map's value however, is that it can very quickly illustrate areas that may require priority in a land management project.

Map: Vicki Godfrey

For the past six months the Tropical Savannas CRC has employed a GIS specialist, Vicki Godfrey, to gather datasets from a variety of sources for a Queensland community group, the Desert Uplands Build-up and Development Strategic Committee (DUBDSC). So far Vicki has made 44 GIS maps of the region for the committee. The maps will be held in the committee's Barcaldine office and interested members will be trained in how to use them.

Tim Fairbairn, the group's strategic coordinator, said land education was one of the biggest issues for the region, citing reduced native pasture species, soil compaction, erosion and salinity as just some of the issues that concern the community.

"The GIS will allow the group to look at resource management issues on a regional basis," he said. By doing that it stimulates debate among the community as these issues are brought out in the open and we can then come to some sort of consensus."

The maps also let people spot the gaps in their land management knowledge. "For example, there is a big need to map natural resources at a regional scale and a consistent scale across the region as well," said Tim.

Eight main datasets were used in collating the maps. Themes include flora, fauna, geology, hydrology, land use and soils. Cadastral data (i.e. from land tenure and property boundary information) and satellite imagery are being used in the latest maps which will give a wet season and dry season comparison of the region.

Related Websites: http://www.nric.gov.au/nric (National Resource and Information Centre, part of the Bureau of Resource Economics).

http://www.nric.gov.au:80/nric/data/nricdata/aussoils.html (NRIC's digital soil database).

http://www.nric.gov.au/nric/data/findar/1201A01.html (NRIC's database on cattle in Australia).

http://www.esri.com.au (One of the largest GIS companies in Australia).

The Desert Uplands covers an area of approximately 75,000km² and extends north of the Flinders Highway near Torrens Creek, and south to about 50km north-west of Tambo.

The area is bounded by a line from Blackall to Hughenden through Barcaldine in the west and the Belyando River in the east.

These centres rely almost entirely on the primary production of the district, and for this reason are vulnerable to any rural decline.

Contact: Tim Fairbairn, Tel: (07) 4651 1002;: Ross Hynes Tel: 07 4781 4128. Email: ross.hynes@jcu.edu.au

Cattle and spread of exotic weeds

While prickly acacia is a useful tree for fodder and shade, it is now out of control in large areas of Queensland. It's also likely to spread into the Gulf and the Northern Territory, resulting in large losses of productive land.

Researchers at CSIRO's Townsville division of Tropical Agriculture have been investigating the weed and its spread to work out how to manage it. Dr Ian Radford, whose work contributes to the Tropical Savannas CRC's studies on landscape restoration, has been monitoring prickly acacia in seven sites over three distinct habitats between Julia Creek and Hughenden and one other at Bowen on the Queensland coast.

Ian and other CSIRO researchers are discovering general patterns in the weed's invasion. So far the study has found that efforts to control the weed should focus on acacia trees along bore drains, where trees are especially dense and seed production per tree is also high. Secondly, the study found cattle are the main source of seed spread. Most of the seed is eaten by cattle and then deposited in the paddock intact, where it readily grows into more trees.

"Our studies at CSIRO Tropical Agriculture and the Tropical Savannas CRC seek to understand the biology of prickly acacia so that we can use our knowledge to control this weed ¾ while allowing landholders to make use of the tree if they wish," said Ian. "Understanding the biology of this tree is the key to tackling the problem."

So just why is this exotic weed so far out of control? One of the major reasons goes back to the early 1970s when a series of floods and out-of-season rains made for ideal conditions for the weed's growth. Most of the trees living today resulted from these years. The situation is further complicated by the fact that many more trees are producing seed than there were three decades ago.

Acacia: a useful fodder.

When cattle eat acacia a percentage of the seeds are passed out into their dung: hence the spread of the exotic throughout northern Australia.

Photo: CSIRO TAG

Efforts to control weeds should focus on bore drains. *Photo: CSIRO TAG*

Controlling trees

To prevent seed spread from acacia trees in a paddock, cattle must either be prevented from eating the pods, or trees must be killed. The trees can be controlled through mechanical (pulling) or chemical means (diuron bore drain or spray/basal bark trees) or by capping bore drains and piping water (this kills most trees and reduces seed production). If cattle are to be moved from an infected area with pods either on the ground or in the trees they should be quarantined for six to seven days. To prevent seed spread from acacia trees, cattle must either be prevented from eating the pods or trees must be killed.

Ian also points out that fire may be a useful tool to kill acacia seedlings. Fire has been found to kill the majority of seedlings even at low fuel levels and in a good wet season, when seedlings are abundant, enough grass growth will occur to feed stock and to fuel fire. If seedlings are not killed at this early stage, and become mature, they are then less prone to fire and much more expensive to kill by mechanical or chemical means.

For more information contact:
Dr Ian Radford, Dr Tony Grice, or Mike Nicholas CSIRO Tropical Agriculture.
Email: ian.radford@ tag.csiro.au

Related research:
Exotic Weeds and their Control in North West Queensland (Qld Department of Natural Resources)
Pipe the Bores (Queensland DNR).

Related Websites: The National Weeds Strategy Page: www.dpie.gov.au/dpie/armcanz/pubsinfo/nws/nws.html

The Tropical Beef Centre's Woody Weeds page: leaky.rock.tap.csiro.au/facts/woody_txt.html

Retirees are the Kings of the Road

"Grey Gypsies" make up the bulk of tourists visiting north-west Queensland, according to a survey by researchers from James Cook University's Tourism Department.

The research, funded by the Tropical Savannas CRC, is the first part of a larger survey which will eventually extend to the Northern Territory, Western Australia and Cape York. JCU Lecturer in Tourism, Dr Neil Black, said the survey was launched because there was little information on who the tourists were and where they were travelling to.

The research found that between 70 per cent and 90 per cent of tourists were "independent travellers"– people who plan their own itinerary and travel in their own vehicle.

"They are predominantly older than 45 years, over half of them are retired and many of them are long-term travellers," said Dr Black. About two-thirds of them live in caravans or tents while travelling and cheerfully describe themselves as grey gypsies or grey nomads.

Dr Black said retirees now finished their working lives with more income than previous generations and were not satisfied to spend the rest of their days 'sitting on the front porch.'

Many of them chose instead to travel, doing the 'round Australia' trip as a sort of pilgrimage, he said.

While they may not spend a lot of money individually, their increasing numbers in the outback had a significant effect on the local economies.

Dr Black predicted that the new millennium will give Australians a renewed sense of interest in their own background and many will travel to the Outback as a result of this.

Tourism Research officer, Ms Amanda Clark, who was also involved in the survey said that the majority of city people who did visit northwest Queensland loved their experience.

"They used words such as 'unspoilt', 'untouched' 'friendly' and they had more positive things than negative things to say about it," she said. Ms Clark said the only real complaint made about northwest Queensland was the state of the roads.

Travellers hesitant about launching in to the outback alone are joining groups called "tagalongs" which can consist of up to 50 vehicles, following an outback trail-blazed by the lead vehicle.

Food and tents, carried by a support vehicle, are supplied to drivers and passengers of the tagging vehicles, said Dr Black.

The Northern Territory has about 1 million visitors per year yet Outback Queensland gets only a fraction of that number, despite having so much to offer, said Dr Black.

"The Northern Territory has been doing this (promotion of its attractions) for a long time, but an increasing number of shires in the outback are realising that they have a lot to gain from tourism," he said.

This first study looks at northwest Queensland, but plans for the research to cover the whole of the tropical savannas are well under way.
— Karen Graydon (JCU, Townsville)

For further information contact Dr Neil Black: Tel (07) 4781 4100 Neil.Black@jcu.edu.au

Related Websites:

http://www.internetnorth.com.au/gulf/ (the Gulf Savanna)

http://www.tourism.org.au/

http://www.env.qld.gov.au/

http://www.tourism.org.au/indexlinks.html (Australian Tourist Commission)

http://lorenz.mur.csu.edu.au/ecotour/EAAHome.html (Ecotourisma Association of Australia)

http://www.lib.monash.edu.au/berwick/ecotour.htm (a list of ecotourism sites on the Web)

ODD SPOT

Fishing spider's dinner makes a magnificent tale

The *Ordgarius magnificus*, or bola spider has a very sophisticated technique to capture prey. By day, it hides in a silk lined retreat among the leaves of native trees such as eucalypts. At night, the mature female spider hangs head down from a horizontal silk strand, and using an extended front leg, she suspends a silken thread about 4 cm long, with a sticky globule at the end (the bolas).

This sticky globule contains chemicals that act as a female moth perfume to lure male moths of a certain species. Like a fishing line, the silk comes from her spinnets (the reel), and can be let out when required, running through the claws on her leg. In response to the vibrations of an approaching male moth, the spider begins to jerk its body so as to swing the bolas around in a circle.

When the moth is close, she lets the thread run and then flicks it, with incredible accuracy, to hit the moth. The confused male moth is then entangled and the spider winds it in, wraps it in silk and eats it. In this species of spider, different perfumes, or pheromones, are used for different seasons or growth stages, to capture the moth species that are available, or those of the best size. *— Tracey Churchill (CSIRO W&E, Darwin)*

CINCRM Seminar Series
March 24, NTU Darwin

Indigenous peoples and constitutional recognition. Martin Flynn (Faculty of Law, NTU). Room 12, Building 24, Tel: (08) 8946 7756

Australia's first National Forum on Environmental Issues Affecting the Sugar Industry
March 24-25, Mackay

Theme: Sustainable Cane Growing Into The Next Century
Contact: Bill Kerr Canegrowers Communications Officer Ph: (07) 3864 6444

Australian Institute of Agricultural Science & Technology Seminar Series
Aquaculture is the future by Chris Barlow, DPI Walkamin
March 26, Mareeba DPI.

Contact: John Clarkson, DPI Mareeba Ph: (07) 4092 8555
Peters Street, 3.45pm Conference Room

Live Cattle Export Forum
AMLC, Livestock Exporters and producer speakers
March 30, Longreach DPI

Contact: Tony Rayner or Desiree Bawden Longreach DPI. Tel: (07) 4658 4400

Second Conference on Fire Effects on Rare and Endangered Species and Habitats
March 29-April 1, Coeur d'Alene, Idaho

The goal of the conference is to increase the knowledge and documentation of the specific interactions between wildfire and rare and endangered species and habitats, and hence in the specific management actions that can be implemented in the maintenance of rare and endangered species.

Contact: Maria Greenlee, IAWF, PO Box 328, Fairfield, WA 99012; Phone (509) 283-2397; Fax (509) 283-2264; email greenlee@cet.com

13th Annual U.S. Landscape Ecology Meeting
March 17-21, Michigan USA

Venue: East Lansing, Michigan
Theme: Applications of Landscape Ecology in Natural Resource Management.
Enquiries: Kevin Gutzwiller, Department of Biology, Baylor University, Waco, TX 76798-7388. Tel: 817-755-2911; iale98@Baylor.edu

Tropical Savannas CRC Fire Management Workshop
March 24-25, Darwin
Venue: MGM Grand Casino, Darwin, NT. Sponsored by the Tropical Savannas CRC. For fire managers and land users from across northern Australia – its aim is to come up with concrete proposals for projects that address major fire management problems identified from across the tropical savannas.
Contact: Deborah Bisa: Tel:(08) 8946 6764. d_bisa@mimosa.ntu.edu.au or Jeremy.Russell-Smith@nt.gov.au

CINCRM Seminar Series
March 31, NTU Darwin
Remote sensing and GIS for indigenous land management.
Jenny Carter (CINCRM/Faculty of Science, NTU). Room 12, Building 24, Tel: (08) 8946 7756

CINCRM Seminar Series
April 7, NTU Darwin
Intellectual property and environmental knowledge. Dr Nancy Williams (CINCRM). Room 12, Building 24, Tel: (08) 8946 7756

AusIMM '98 (Annual Conference), April 20 – 24, Mount Isa
Contact: Conventions Department, The AusIMM. Tel: (03) 9663 1322; Fax: (03) 9662 3662. email: conference@ausimm.com.au

1998 National Conference: "Quality in Postgraduate Research: Managing the New Agenda"
April 23–24, Adelaide

Hilton International Hotel Adelaide, Call for Papers will be distributed in late August. Refereed proceedings are planned. To register your interest or for Further information please contact: SAPMEA Conventions, 80 Brougham Place, North Adelaide SA 5006. Ph: 08 8229 6060 Fax: 08 8239 1566 Email: conv@sapmea.asn.au

Australian Institute of Agricultural Science & Technology Seminar Series
The New Agronomy by Steve Ockerby, April 30, DPI Mareeba
Mareeba DPI, Peters Street, 3.45pm Conference Room. Contact: John Clarkson, DPI Mareeba Tel: (07) 4092 8555

Australian Institute of Agricultural Science & Technology Seminar Series
Attack of the Acid Sulphate Soils by Errol Best,
June 25, DNR Mareeba

Mareeba DPI, Peters Street, 3.45pm Conference Room. Contact: John Clarkson, DPI Mareeba Ph: 07 4092 8555

Society for Conservation Biology International Meeting 1998
July 13 –16, Sydney

The 12th annual meeting and the third international meeting of the Society for Conservation Biology will be held at Macquarie University, Sydney, Australia from July 13 to 16th 1998.

Underground Operators' Conference
June/July 30-3, Townsville

Contact: Sheara Maidment. Tel: (077) 225 885; Fax: (077) 214896

ISEM '98. Meeting of the International Society for Ecological Modelling.
August 2-4, Maryland

Venue: Baltimore, Maryland. Held in association with the 49th Annual Meeting of the American Institute of Biological Sciences. Contact: Anthony King, Bldg. 1000, MS 6335, Oak Ridge National Laboratory, P.O. Box 2008, Oak Ridge, Tennessee 37831-6335. Tel: 423-576-3436; awk@ornl.gov

National Dry Lands Salinity Program Conference. August 11-13, Charters Towers, Qld

Contact: Roger Landsberg *Trafalgar Station*
Tel: (07) 4787 6677

22nd International Ornithological Congress 16-22 August 1998, Durban, South Africa

Contact: Dr. Aldo Berruti (aldo@birdlife.org.za). Postal Address: P.O. Box 1935, Durban, 4000, South Africa. Tel: +27-11-8884147. Fax: +27-11-7827013

Mining and the Environment II. September 12-16, Canada

Venue: Sudbury, Ontario, Canada. Themes: Ground and surface water remediation, environmental data management systems, ecosystems, new technology-old problems, mining and society. Contact: Sudbury '99 Centre in Mining and Mineral Exploration Research, Laurentian University, Sudbury, Ontario, P3E 2C6, Canada. Tel: +705-673-6572; Fax: +705-673-6508; Email: cmosher@nickel.laurentian.ca or bevans@nickel.laurentian.ca

Sixth Australasian Applied Entomological Research Conference
"Pest Management –Future Challenges"
September29-October 2, Brisbane

In conjunction with the 1998 Australian Entomological Society 29th AGM and Scientific Conference 26-29 September 1998 Venue: The University of Queensland, Brisbane, Aust. The AAERC will be held in conjunction with the 1998 Australian Entomological Society Conference and AGM (AESC), which will be held from 26-29 September 1998. Contact: Sally Brown, ICTE Conferences The University of Queensland, Brisbane, Aust. Tel: (+61 7) 3365 6360 Email: sally.brown@mailbox.uq.edu.au

Rib ticklers from the Tropical Beef Centre

http://leaky.rock.tap.csiro.au/fun/funstuff_txt.html

This issue's really hilarious jokes are from the TBC. For more (if you can take it) just go to their site.

¨ Two cows walked into a bar. You'd think the second one would have stopped.

¨ What do you call a drunk cow?
¨ *Dangerous.*

¨ What do you call a tough cow?
¨ *Good boots.*

¨ Why don't cows drive cars?
¨ *'Coz they can't afford the petrol.*

¨ What did the cow say to the blonde?
¨ *I never enter into a battle of wits with an unarmed opponent.*

¨ What do you call a cow with spots?
¨ *Depends on its name.*

Savanna Links is edited and produced by Tropical Savannas CRC. Articles can be used provided acknowledgements are made. Views expressed in this newsletter are not necessarily those of the CRC. Contact Peter Jacklyn: Tel: (08) 8946 6285. Email: peter.jacklyn@ntu.edu.au. Or Kate O'Donnell Tel: (07) 4781 5967. Email: kate.odonnell@jcu.edu.au Front and back cover design, WWd. Printed by Prestige Litho.

Fine dining with bush tucker

If you're after something a little out of the ordinary to tempt your palate take a look at the Bushtucker Supply Australia Home Page at http://bushtucker.com.au/

You can find quite an array of foods and flavours unique to Australia on this site. There's also tips on how to host your own bush tucker party and how to make a bush tucker menu. And there's plenty of recipes. Some of the delicacies on offer include: emu spring rolls, wattle pavlova, witjuti grubs in sweet Thai chilli sauce and kangaroo kebabs — and then you can wash it all down with some rainforest punch.

OUR STAKEHOLDERS

ABORIGINAL COMMUNITIES

PASTORALISM

TOURISM

MINING

CONSERVATION

DEFENCE