PASSION: PhD candidate Alea Rose.

Algae ardour blooms into PhD project

By PENNY BAXTER

WATCHING the green, brown or pinkish red clouds of algae bubbling inside 500 litre plastic algal bags of her father's research laboratory is a lasting memory for Alea Rose, 24.

The Charles Darwin University PhD candidate has just completed Honours in what became her favourite subject, algae.

Alea's passion for algae and aquaculture inspired her research into using micro algae to remove unwanted nutrients from waste water and potentially save the NT's aquaculture industry thousands of dollars.

At age six, Alea moved to the NT with her father, who was researching pearl oyster larvae.

"My sister and I would be dragged into the hatchery to help Dad, and I used to sit in the algae room and watch the algae bubbling in their bags," Alea said. "I also used to help out with the odd job like feeding the larvae or monitoring the autoclave used to sterilize seawater while doing my homework. I just loved it.

"Aquaculture is definitely an industry of the future because the fishery stocks in the wild are decreasing and I want to help find solutions to alleviate the pressure on our marine stocks," she said.

While still in a trial phase, Alea said several companies had shown interest in her research, which looks at using a naturally occurring alginate – a jelly substance found in seaweed – to entrap the algae suspended in the waste water so it can absorb excess nutrients.

The algae absorbs the nutrients during photosynthesis, effectively removing them from the water, and the algae remains suspended in the jelly-like alginate, making it easier to remove than using alternative methods such as a centrifuge.

Alea, who has been studying at CDU since 2004, plans to complete her PhD on algae research and hopes to see it trialed in local aquaculture production in the Northern Territory.

Research shows gamba grass a high fire threat

A WEED that threatens trees and properties and now flourishes in the Top End is being targeted after 10 years of research revealed its deadly nature.

Plant ecologist Associate Professor Samantha Setterfield leads a CDU team working with the NT Weeds Management Branch and Bushfires NT on the potential threat and management of gamba grass.

The research revealed gamba grass competed with other vegetation for soil moisture, reduced the number of trees and had higher fuel loads that created fires up to 10 times more intense than native grass fires.

Introduced into the Top End as an alternative pasture for cattle in the 1980s, gamba grass was declared a weed early last year after a CDU joint research team spent more than a decade researching and assessing its risks.

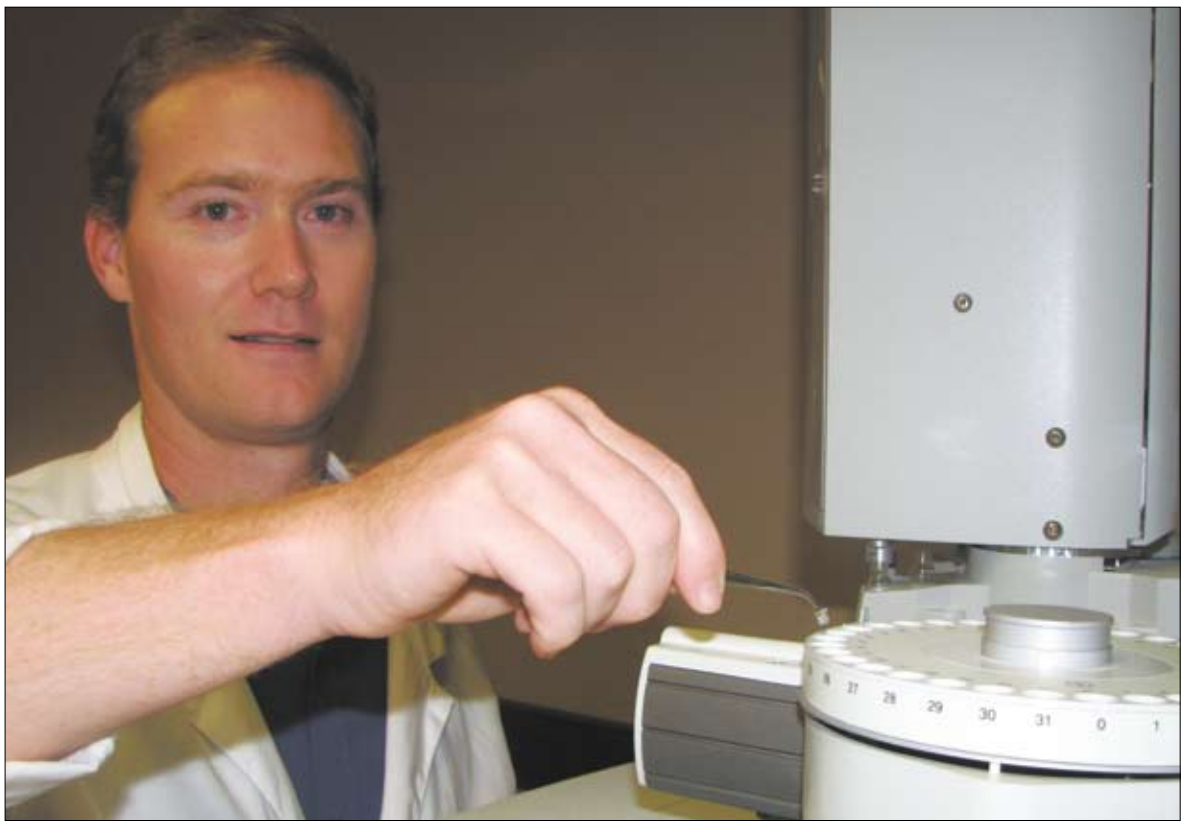
Dr Setterfield said concerns about gamba grass were first raised in the 1990s as the tall, perennial African grass began to spread outside pastoral land, but a push to target the grass was hampered by a lack of research into its environmental and social impacts. The need to find out more about the potentially dangerous gamba grass sparked several research projects looking at its spread, how it affected native vegetation and changed fire regimes.

The latest research findings prompted a recent warning from the Bureau of Meteorology and Bushfires NT that fire bans would be more frequent in Darwin's rural area as fires fuelled by gamba grass burnt more intensely.

The research has also seen gamba grass officially declared a weed in Queensland and Western Australia.

The CDU-led collaborative team was now spearheading research into control measures and its management and would continue to map its spread using aerial survey.

Plants hold climate change secrets



TIME CAPSULE: Dr Lucas Cernusak searches for climate change signs in plants.

By PENNY BAXTER

A TECHNIQUE commonly used by forensic scientists is being used to detect climate change by measuring variations in the physiology of plants.

A research fellow with CDU's Faculty of Education, Health and Science, Dr Lucas Cernusak, is one of the leading researchers in Australia using the technique to measure differences in plant physiology to unlock the secrets of climate change and its impact on vegetation.

The Darwin-based researcher uses special equipment, including a state-of-the-art isotope ratio mass spectrometer, to record the different ratio of two carbon isotopes that act as a "signal" of climate change preserved in the plant like a time capsule.

Dr Cernusak said that in the same way a tree's age could be determined by the number of rings, the technique measured the physiological changes of the plant in response to changing environmental conditions including temperature, moisture and carbon dioxide levels.

He discovered the new use for "stable isotope research" in forensic science at a conference in Potsdam, Germany earlier this year.

The ISOCOMPOUND 2009 conference brought together the leading minds in this field and Dr Cernusak was one of two Australian researchers of the 20 international scientists invited to present their research.

Acclaim for greenhouse gas, soil researcher

A CDU researcher has achieved international recognition for her work after being invited to an exclusive workshop in Germany.

Dr Samantha Grover, a research associate in the Faculty of Education, Health and Science, was the only Australian among 30 international researchers invited to take part in the Soil Organic Matter Workshop in Friesing, near Munich.

Dr Grover is working on a collaborative project to monitor and record the amount of greenhouse gases – methane, nitrous oxide and carbon dioxide – released and absorbed by soils at 17 locations in savanna vegetation at Howard Springs and the Douglas Daly area.

The soil was tested at each site and levels of the gases were measured and fluctuations recorded.

"These three gases are all absorbed by soil or emitted depending on the temperature, moisture content and amount of organic matter in the soil," she said.

"This research is very important because we can find out how our land management practices are impacting the soils and affecting greenhouse gas levels," she said.

"We are looking at the effect of fires and different agricultural management practices on the organic matter in soils to find out if the agricultural regime or fire scheme increases or decreases the amount of greenhouse gases emitted or absorbed by the soil."

Green ants work over-time to save crops

THE feisty green ant is known for its painful bite, but its aggression could save mango and cashew farmers millions of dollars worldwide.

CDU's Professor of Zoology, Keith Christian is spearheading ground-breaking green ant research with fellow world-renowned CDU researchers Dr Renkang Peng and Professor Karen Gibb.

The team's research demonstrates that green ant colonies can completely replace the use of strong insecticides to rid mango, cashew and mahogany trees of insect pests including fruit fly, caterpillars, tea mosquitoes, leaf hoppers, thrips, mango tip borers and fruit spotting bugs.

These insecticides are costly and can be harmful to health and the environment.

Apart from the cost saving – an estimated 22 per cent cut in costs during one NT mango crop trial – the use of green ants can increase the number of mangoes produced in a crop and improve quality, further boosting overall profits.

"When you use green ants to control pests on a mango crop, they can increase the yield of first class fruit, which are the best quality mangoes fetching the highest prices," Professor Christian said.

Professor Christian said the techniques the team had developed were being used on cashew crops in the NT, Vietnam, Papua New Guinea, Sri Lanka and Mozambique.