



PhD student Nic Cummings takes a close look at a white-tailed spider. He has discovered a fungus in New Zealand that will kill the pest.

Fungus that kills white-tailed spiders

A fungus that kills white-tailed spiders has been discovered in New Zealand by a University of Canterbury student working for AgResearch who hopes to develop it as a biocontrol agent.

AgResearch-funded PhD student Nic Cummings discovered the fungus *Nomuraea atypicola* on a dead, infected spider in native forest near Lake Kaniere, Westland. It is only pathogenic toward spiders and can grow on white-tailed spiders and kill them within three weeks.

Nic is now working with AgResearch scientist Dr Cor Vink to find a way to stabilise the fungus spores so they can be delivered to white-tailed spiders — perhaps by way of traps.

"Once we've done that, perhaps we can formulate the fungus," says Cor who has also been testing ways of trapping and monitoring spiders at ports.

"Maybe we can modify what I've already done there and apply it to getting this fungus onto spiders, or maybe we need to try a completely different tack."

Nic is one of a handful of people in the world who study fungi that attack spiders. His project is part of his PhD work that focuses on examining the biodiversity of invertebrate-pathogenic fungi in native forests. The ultimate aim is to find novel strains that can be used for the biocontrol of arthropod pests. Arthropods are invertebrates that have jointed limbs, a segmented body, and a protective cuticle covering the outside of the body.

"Spider pathogens are found in rather hidden microhabitats such as under banks, under

stones and wood, inside holes and crevices in trees or on the undersides of leaves. They're usually found in low numbers and there are very few records of spider-pathogenic fungi from New Zealand — mostly discovered by mycologists searching for other fungi."

Nic currently has isolates of 10 species of spider-pathogenic fungi, including one that has not been previously described, and most of which have rarely been recorded worldwide.

Cor says that white-tailed spiders are a pest because they eat beneficial spiders. White-tailed spiders do have a painful bite but New Zealand and Australian studies have shown they are not dangerous to humans.

Oxygen breathing fresh air into science

A group of elite younger New Zealand scientists is giving science practitioners a voice at the Government policy table through their involvement with Oxygen Group.

Two AgResearch scientists, doctors Theresa Wilson and Vic Arcus, were invited to be part of the 10-member Oxygen Group – the brainchild of Ministry of Research, Science and Technology (MoRST) chief executive Dr Helen Anderson.

Vic says Oxygen Group has struck up a two-way dialogue with government agencies that is free of institutional positioning.

"It's not that institutional priorities aren't important but if you only get their feedback then you run the risk of not hearing from the science practitioners."

Oxygen Group was established in October 2004 as an experiment to nurture young leaders in research, science and technology and create a bridge between the laboratory and the boardroom. Its members come from a wide range of science institutions and disciplines, including the biosciences, social sciences, the information technology (IT) sector, chemical

and physical sciences, geosciences and Mātauranga Māori, or Māori knowledge.

Theresa and Vic were both founding members and say Oxygen Group has worked hard to foster better science networks between early- to mid-career scientists, and policy makers. Last year it organised the hugely successful Running Hot! conference that attracted about 200 people from a range of disciplines and institutions.

"It was a great chance to engage and debate with scientists from outside your direct field," says Theresa, AgResearch's Animal Genomics Section Manager.

A spin off from Oxygen Group is the recent creation of He Waka Tangata – a new group for the social sciences based on the Oxygen Group model.

"The formation of this new group illustrates how networks are valued and are becoming more firmly established," says Vic who has a joint appointment with AgResearch, as group

leader of the Forage Biotechnology Section protein engineering laboratory, and the University of Waikato.

"We're all benefiting from the leadership guidance we're receiving. It's a great way for science to move forward."

Helen says that in addition to the leadership development role of the Oxygen Group, it forms an important link in the chain of contacts that MoRST maintains with working scientists across the sector.

"What we have in the Oxygen Group, and really value, is a bunch of people at the peak of their scientific careers, who are not institutionally aligned or embroiled in management.

"And we've been extremely lucky in having scientists of the calibre of Theresa and Vic in the group. They have both made an enormous contribution to its work and its ability to influence and operate as a force for real change."



Drs Vic Arcus and Theresa Wilson are pictured at a recent Oxygen Group meeting.

New science strategy head brings wealth of experience

AgResearch has appointed Dr Travis Glare as General Manager – Science Strategy Services, a position that will drive the 2020 Science strategy, the company's vision for keeping New Zealand prosperous until 2020 and beyond.

Formerly manager of AgResearch's Biocontrol, Biosecurity & Bioprocessing section, Dr Glare has taken up the role that was vacated by outgoing Chief Science Strategist, Dr Stephen Goldson, who has taken up a new position as AgResearch's Chief Scientist.

Dr Glare has been employed by AgResearch since its inception, working firstly as an insect pathologist and molecular biologist in biological control and biosecurity. More recently, he led the Biocontrol, Biosecurity & Bioprocessing section for three years, following other science leadership roles.

"The next few years will be crucial in terms of raising productivity and reducing the environmental footprint of pastoral farming in this country," says Dr Glare.

"I'm looking forward to the challenge of overseeing and driving AgResearch's science strategy to assist in delivering these outcomes."

Dr Glare trained at Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO) and the Australian National University where he gained a PhD in insect pathology, has worked in the US and has conducted research on a number of international programmes. In New Zealand, he led research on environmental impacts of biotechnology and worked with the Ministry of Agriculture and Forestry (MAF) on biosecurity incursions.

Having worked with most research institutions in New Zealand – including as an Honorary Fellow in the Department of Microbiology, Otago University, and as a researcher in the Lincoln University based Bioprotection Centre of Research Excellence (CORE) – Dr Glare



has an excellent understanding of the New Zealand research community. He is based at AgResearch Lincoln.

AgResearch internships valuable for international students

AgResearch Lincoln's Food & Textiles Group was the perfect fit for a group of international university students on 10-week internships.

Shravni Jain, Vikash Singh and Sunayna Jain are students at the Indian Institute of Technology's Department of Textile Technology, while Robina Ang has a scholarship to study for a Bachelor of Bioengineering at the National University of Singapore. Internships are a required part of their respective courses and they each applied for one at AgResearch Lincoln by submitting their CVs.

A high number of visiting students and student internships are hosted throughout the year at each of AgResearch's four main campuses – Lincoln (near Christchurch), Ruakura (Hamilton), Grasslands (Palmerston North) and Invermay (near Dunedin), with a significant number of

them taking part in the summer student internship programme.

Stewart Collie, of AgResearch Lincoln's Textile Science & Technology Section, supervised Vikash and Sunayna and says their internships at AgResearch were the result of relationships within the international textile research network.

Dr Azam Ali, of the Biocontrol, Biosecurity & Bioprocessing Section, supervised Shravni who worked on a project that aims to develop a windproof, waterproof and breathable membrane using bio-based coatings for wool fabrics. Vikash worked on developing a cloth that will respond



The international students AgResearch Lincoln played host to are, from left, Vikash Singh, Shravni Jain, Sunayna Jain and Robina Ang.

to changes in body heat, while Sunayna's work focused on textiles that respond to pressure. Robina, who was supervised by Dr Alex Tasker, of the Textile Science & Technology Section, focused on conductive textiles including garments that are capable of controlling peripheral electronic devices.

Out of the chiller and onto the shelf



AgResearch's Dr Trevor Jackson and Jayanthi Swaminathan take a closer look at probiotics at their Lincoln-based laboratory.

Live bacterial microbes are set to become available in non-refrigerated goods such as breakfast cereals thanks to a revolutionary technology created by AgResearch scientists for Joint Venture Company, EnCoate.

Known as probiotics, the microbes have beneficial health effects on humans and animals. Currently, their application is limited because the delicate probiotic bacteria must be refrigerated and cannot be mixed with other ingredients. However, EnCoate recently signed a multi-million dollar deal that will enable it to further develop two technologies that stabilise the microbes so they can be used to enhance non-refrigerated foods such as breakfast cereals, infant milk-powders and dog-biscuits.

EnCoate's ultimate aim is to extend the shelf-life of probiotics to two years when stored at ambient temperature and humidity. By removing the need for cold storage, EnCoate is effectively moving probiotics from a supermarket's dairy section to the shelf, says EnCoate acting CEO Bridgit Hawkins.

"The new technologies protect against moisture and temperature, enabling probiotics to be added to a wide variety of ingredients and used in products where their survival was previously impossible. The technology has the potential to lead to a whole range of novel products."

She says the underpinning science of an AgResearch team led by Dr Trevor Jackson helped secure the capital that will take EnCoate to the next phase. The core focus of the Lincoln-based team, that is part of the Biocontrol, Biosecurity & Bioprocessing Section, is biocontrol, with its science being behind such products as the grass grub biocontrol, BioShield™.

"Working with EnCoate has enabled us to look together for other opportunities," says Trevor.

"We're taking our biocontrol technology and applying it to a much wider area that stretches into the realms of human health. It never would have got to this level if it had been in a pure research situation.

"It's a plus-plus situation. We've now got better tools to maintain our biocontrol programme and to also take our work to new areas where the potential of beneficial microbes can be realised."

EnCoate, a 50/50-owned AgResearch and Ballance Agri-Nutrients Joint Venture Company, recently named BioPacificVentures – one of Australasia's biggest life sciences venture capital funds – as a new partner following its \$6.3 million investment in the company.

AgResearch backing for dairy-yard of the future



The Hon. Nick Smith MP, opposition spokesman for the environment (right), chats to Malcolm Hawthorn, Herdhomes' technical design consulting engineer.

A re-design of the humble cow shed is helping to reduce the pollution caused by cows and has one dairy farmer believing he has future-proofed his farm's effluent systems.

The Whangarei farm of Brett and Gayle Farrell is playing host to New Zealand's first experimental milking yard that does not use water for yard cleaning and turns cow effluent into fertiliser.

Known as a Herdhomes Dairy-yard, it provides a multi-purpose, covered space to house cows and replaces the traditional circular yard attached to a farm dairy. The milking yard's slatted floor is situated over concrete bunkers that collect cow effluent. Once the effluent-processing bunkers are full, the slats are lifted off and the dry, nutrient-rich manure is scooped out and thrown onto paddocks.

"It's the best nutrient-recycler system I've seen — turning cow effluent into fertiliser. We've future-proofed our effluent systems," says Brett.

The technology was developed by Northland company Herdhomes Systems Ltd through a collaboration between AgResearch, Dexcel, Dairy InSight and Fonterra. Herdhomes Director Tom Pow says the yards generate four major savings for farmers.

"We're saving ourselves water, time and energy, nutrients and the gas problem that can come out of storing effluent.

"Dairying can be very profitable but it can also be a double edged sword in terms of impact on

the environment. Because you don't have to wash it down, the yard saves about 20 litres of water per cow each day."

The Herdhomes Dairy-yard is thermostatically controlled, keeping the cows at the correct temperature — all of which adds up to increased productivity, says Brett.

"If the weather's miserable, the cows are still happy, and when it's hot it keeps them cool. I would definitely recommend this yard to other dairy farmers."

AgResearch Director Susan Huria spoke at the opening of the experimental Herdhomes Dairy-yard and praised the system for its focus on the environment.

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AgResearch 2007 photography contest winners



For the third year in a row, Hugh Mitten of Christchurch Boys' High School has taken out a major prize in AgResearch's High School Agriculture & Science Photography Contest.

The winning photos: top, Hugh Mitten with his shot of McNaught's comet, bottom left, Sophie Burridge's winning entry entitled "Give us some scraps" and Sarah Wilson's shot of a hot air balloon over a rural Waikato scene.

Hugh's winning 2007 entry took first place in the Wintec-sponsored Science category, while Sophie Burridge, of Auckland's Carmel College, won first prize in the MAF-sponsored Agriculture section with her photograph entitled "Give us your scraps!" They each won a \$1200 Olympus digital camera, \$250 cash, and a \$250 framed trophy photograph for their school.

The photo contest has been held by AgResearch for the past three years to encourage students to look closely at science and agriculture.

This year it attracted a record 183 entries from students throughout New Zealand. Two of the winners travelled to Parliament earlier this month to receive their prizes from Minister for Crown Research Institutes, the Hon Steve Maharey. The prizes totalled \$12,000 in Olympus digital cameras, travel and trophies.

The Brisbane Biofutures award, sponsored by MAF and Wintec, went to Sarah Wilson of Hamilton's Fraser High School for her artistic



photo of fruit. As part of her prize, she attended the week-long Biofutures Science Conference in Brisbane and was there when the Parliamentary prize giving occurred. Sarah also won the Gallagher Group-sponsored Waikato Student Resident award for her shot of a hot air balloon over a rural Waikato scene.

Emily Grosscurt, of Pukekohe High School, came second in the Science category, with Josh Dubbeld, of Motueka High School, taking out third. Second and third prizes in the Agriculture section went respectively to Peter Muller, of



Auckland's Sacred Heart College, and Mitchell Round, of Hamilton's St Paul's Collegiate School.

- To view the winning photos, go to www.agresearch.co.nz/community/photocontest