

Super seeds promise better crops

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Flinders researchers Professor Chris Franco and Dr Hoang Xuyen Le and SARDI scientist Ross Ballard. Credit: Flinders University

South Australian research that improves wheat, pastures and other crop yields has sown the seeds for global distribution deals and a timely

partnership with an innovative US agricultural technology company Indigo Ag Inc.

The research, led by Flinders University with State Government and industry partners, will reap rewards for food production around the world after agreements are signed for its commercial development.

The global licensing agreement between Flinders and Boston-based Indigo revolves around a series of specially selected plant [microbes](#) that can promote more robust plant growth for major grain and pasture staples – without the cost of additional chemical fertilisers and pesticides.

These [beneficial microbes](#), called endophytes, can be described as probiotics for plants. Thousands of endophyte strains, which occur naturally within healthy crop plants, had to be tested to arrive upon the 'winning formula' – first in glasshouse trials and then in the field.

"With a significant gap between current food production and the anticipated needs of the growing world population, there is a real urgency to bring new innovation to agriculture," says David Perry, CEO and Director of Indigo. "Partnerships and collaborations like the one with Flinders are essential in developing microbiome products that can serve growers, consumers and the environment," he says.



Indigo Ag Inc CEO David Perry and co-founders and Chief Technical Officer Geoffrey von Maltzahn check trial crops in a US greenhouse. Credit: Flinders University

Under the terms of the agreement, Indigo and Flinders will partner in further development of the elite SA strains, with the goal to bring to market products that are designed to complement a plant's natural processes to improve resilience across each phase of plant development while boosting [crop yields](#).

The SA strains have been extensively studied in legumes, including

perennial pasture crop lucerne, and have the potential to be beneficial to other crops. The research was conducted by Flinders University and the South Australian Research and Development Institute (SARDI) – the research division of Primary Industries and Regions South Australia (PIRSA)

The research commenced more than a decade ago when Professor Chris Franco, using his background in antibiotic development in the pharmaceutical industry, experimented with taking 'beneficial microbes' from human health into the plant world.

"The partnership with Indigo is very exciting for our plant microbe discoveries as it can support both IP development and large-scale trials in the field both in South Australia and overseas," Professor Franco says. "Our early studies confirmed the potential of the discoveries, with field trials with microbes treated as vital seed inoculants for lucerne production showing very promising results."

In other small-scale trials, the local researchers also found certain microbes interacted with other microbes to dramatically improve nitrogen fixation in pastures and legumes, with increased yields of up to 50% seen in lucerne pasture and soy bean grain legumes.



Credit: Flinders University

SARDI scientist Ross Ballard says the new microbes, when added during routine seed inoculation, improved nodulation and overall plant growth.

In separate trials, with funding from Flinders and the Grains Research and Development Corporation, the SA researchers also discovered other microbes for wheat and barley that can lift harvests by up to 10% and some of them control common diseases that regularly reduce yields. The microbes can be incorporated at seeding time, including as coatings on

the seeds with the intent to promote faster and healthier growth.

"It's always very difficult to take new research into the field, so we're very happy to have some big backers on board to explore the potential of our discoveries," Professor Franco said.

"Finally we have got a real opportunity to get this sustainable technology onto the world stage," he says, acknowledging the contribution of Flinders and SARDI researchers Mr Ballard, Dr Steve Barnett, Sophia Zhao and former PhD student Hoang Xuyen Le.

Provided by Flinders University

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