COMBINING TRADITION AND INNOVATION TO BOOST CANOLA ESTABLISHMENT

In the face of increasing climate variability, integrating traditional knowledge systems with modern agricultural practices will become critical for sustainable food production.

Innovative startup Rainstick is pioneering a novel approach to seed treatment, combining traditional knowledge with modern technology to influence and improve crop growth, yields and resilience.

Rainstick co-founder and Chief Rainmaker Darryl Lyons said, "Our people, the Maiawali tribe — a rainmaking tribe from southwest Queensland — with a rich history of over 60,000 years of sustainable land management practices, have long recognised the benefits of thunderstorms for agriculture."

"While many growers attribute plant growth after rainfall primarily to nitrogen fixation, Rainstick aims to explore the broader implications of bioelectricity and its relationship to climate-driven agricultural practices.

"We're blending traditional knowledge with modern science, looking to enhance crop establishment and yields, particularly in canola, to address ongoing climate challenges."

Darryl's co-founder, and Rainstick's Chief Thunderstorm Creator, Mic Black have drawn on their previous experiences in agricultural technology and biotech startups to guide their current venture. Lessons learned from their earlier startup projects have provided essential insights into risk management and market dynamics, which are informing their current strategies.

This pragmatic approach enables them to navigate the complexities of innovation in agriculture, with a clear understanding that success will require perseverance, collaboration, and continuous validation of their technologies.

EARLY TRIALS YIELD PROMISING RESULTS

The Rainstick team is taking a pragmatic approach towards developing its technology, ensuring that any innovations introduced on modern farms are both effective and financially beneficial.

"When introducing new technologies on-farm, growers want to know it's going to work and it's going to give them a return on their investment," Darryl said.

"We know it's a long haul and we're here to do the hard work and get the results, working hand-in-hand with growers across the country."

Starting with lab trials, followed by nursery trials and small-scale paddock plot trials involving more than 75,000 seedings across 220 trials, the team is now focussed on extensive field trials in canola addressing challenges faced by growers.

"We initially focused on wheat, off the back of the large research project by CSIRO and the University of Queensland with APSIM modelling, showing that if you can double the size of wheat seedlings in the first month, this leads to increased growth and biomass and an increase of an average of 16 percent crop yield across Australia's growing regions," Darryl said.

Rainstick co-founder and Chief Thunderstorm Creator Mic Black said, "We have run over 70 tests and 11,000 seedlings over three varieties of canola seed under controlled growing conditions. We have observed multiple trials having a significant 10 percent or greater increase in hypocotyl length and thickness, as well as increases in biomass."

"It's about balancing the right treatment recipe to influence the traits important to that variety, under specific growing conditions for individual growers needs. There is always a trade-off."

Germination issues cost the Australian canola industry around $100—$200 million annually. By enhancing germination rates and promoting early vigour without relying on heavy chemical inputs, Rainstick's treatments offer a potential pathway to improve canola yields in a sustainable manner.

NAVIGATING THE TRADE-OFFS TO BOOST CANOLA ESTABLISHMENT

A GRDC survey of canola growers and agronomists across Australia in 2020, found the most common causes of poor establishment were marginal soil moisture (76 percent), incorrect sowing depth (65 percent) and soil crusting (29 percent).

In Australia, growers are increasingly opting to sow canola crops earlier to optimise yield potential. But this approach comes with trade-offs including the risk of poor crop establishment (50—60 percent) due to factors such as false breaks, inadequate soil moisture, and elevated soil temperatures. The small and oil-rich canola seeds typically struggle with emergence when sown at depths greater than 30mm, particularly in soils that are prone to crusting. The preferred seeding depth for canola is generally shallow, around 20mm, but this shallow sowing depth increases the likelihood of false breaks and limits the ability to access stored moisture deeper within the soil profile.

Research investments aimed at developing genetic solutions to enhance canola establishment—focusing on early vigour and longer hypocotyls for deeper sowing to access soil moisture—have identified multiple overseas varieties that demonstrate improved vigour and/or longer hypocotyls, and these varieties show better emergence when sown at depth.

RAINSTICK

Founded in January 2022, Rainstick aims to enhance plant vigour without requiring farmers to alter their existing practices. This innovative non-chemical seed treatment is designed to improve seedling growth during the crucial first 14 days post-sowing.

Rainstick uses electricity to replicate the natural impact of lightning, promoting faster and more sustainable crop growth, while maintaining existing on-farm infrastructure and management practices.

The team is focused on increasing yields without altering on-farm practices. Collaborating with established seed treatment companies and key producers, Rainstick employs a complementary process that resembles the current methods used in conventional chemical-based seed treatments.

Through innovation and engagement, Rainstick is working to reduce the impact of extreme weather and climate change on the agricultural landscape.

Electric seed treatments offer a chemical-free method for growers to boost yields and decrease their environmental impact, helping to provide clean food for an additional two billion people by 2050.

GRASSROOTS COLLABORATION

Key to success is understanding local farming challenges. Through collaboration with growers, the team aims to refine their technology further, to develop solutions tailored to specific crops and regional conditions.

“We are looking to conduct extensive trials across seasons and different soil types, over the next two years, enabling us to validate the findings and make necessary adjustments as we progress,” Mic said.

“We don’t have all the answers, and that’s why it’s so important to gain feedback and insights from growers, to guide and work with us to shape the technology and treatments for different canola varieties.”

Darryl agreed, “Our goal is to deliver commercial products that address the evolving challenges faced by Australian growers across different growing regions.”

“Working with growers from the outset, will ensure our treatments align with practical farming goals and operations.”

Fostering a culture of experimentation and engagement, Rainstick aspires to play a pivotal role in shaping the future of Australian agriculture, providing resilient solutions for current and future generations.

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