

PIRSA AgTech Growth Fund

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HORTICULTURE
INDUSTRY



Flux Robotics

Building the next step change in weed management



Jordy Kitshcke's interest in technology of all kinds was piqued during his upbringing on a cropping and sheep farm at Jamestown in South Australia's Mid North.

After completing university, he co-founded a company using laser technology to measure meat quality.

Ever the innovator, Jordy began thinking about which problem he wanted to solve next. That led him to start Flux Robotics. Since its inception in 2021, Flux has been building and refining a number of products which Jordy believes could unlock a new paradigm of farming.

One of those products is a high-precision sprayer which uses AI technology to detect and spray weeds in-crop – a departure from the traditional method of a blanket spray application across the crop.

Through a grant from the Department of Primary Industries and Regions' (PIRSA) AgTech Growth Fund, Jordy and the Flux Robotics team have been working on another project they believe will be a significant change in managing weeds.

Industry challenge

When Jordy was pondering the next problem to solve through innovation, he kept coming back to the increasing challenges with pest, weed and disease management on-farm.

According to the Federal Department of Climate Change, Energy, the Environment and Water (DCCEE), the cost of weeds to agricultural industries is estimated at about \$4 billion per year.

“Growers are facing a number of headwinds when it comes to weed management, including herbicide resistance, chemical prices and both regulatory and consumer pressure on chemical use,” he says.

“I thought, rather than looking for an incremental improvement, maybe there’s a step change in weed management hidden out there.

“So, we started tinkering and that led me to think robotics could be the next step change. Specifically, the ability for a machine to work 24 hours a day, seven days a week in a highly precise way.”

The result was a robotic arm for removing weeds without the need for herbicide. The arm pulls or cuts the weed from the ground – roots and all – lessening the impact on moisture and nitrogen for the crop.

Approach

The AgTech Growth Fund grant has allowed Flux Robotics to work on optimising the robotic arm.

According to Jordy, the ultimate aim is speed, because it has a feedback loop on itself, the smaller you can get the weeds, the faster they are to remove, which means you can be back at that same location again sooner, which means the weeds are smaller.

“In order to optimise speed, we needed to do some further study on the physics of weed removal,” he says.

“We have been collecting data on how much force and energy is required to remove different species of weeds at different sizes in different soil types.

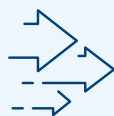
“That has helped us to better specify the requirements of the motors within the robot and its power supply systems.”

Outcomes

Through extensive work in the field and in the workshop, the Flux team has managed to increase the efficiency of the robotic weeder to pull one weed per second.

“That result is an order of magnitude compared to where we started with the technology,” Jordy says.

“We still have a lot of work ahead of us to get to paddock scale, but we are making progress and heading in the right direction.”



Future opportunities

While Flux continues to refine the technology, Jordy is thinking of ways it could be implemented on-farm.

“The robotic weeder is reasonably agnostic technology in that it could be used in any sector where weeds are an issue,” he says.

“We’re refining the system in a number of different environments. We’re confident we can bring the cost down significantly over time, but we need to start somewhere so we’re starting where there are acute weed problems such as where chemistry isn’t available, organic production, and herbicide resistant weeds.”

The actual roll-out of the technology is another aspect.

“We believe the best fit for this technology is on an autonomous unit, that you can keep very lightweight and can work around the clock,” Jordy says.

“Another way it could be implemented is by attaching several of the arms to a three-point linkage rig on the back of a tractor, however our focus is on full autonomy.”



Producer’s view

Flux is looking to partner with producers who have an interest in robotics to help put the robots through their paces in field conditions.

“We’re currently working with farmers whose vision is to get to the point where they aren’t using any chemicals at all, not to become certified organic, but to produce high yielding, low input cost crops,” Jordy says.

“Those farmers see the technology we’re developing at Flux as a key piece of that puzzle.

“One of the most helpful things for us is having farmers involved who want to provide feedback on the technology. Having farmers in the loop really helps us to iterate quickly and effectively.

“If there are farmers who are interested in being involved then we would encourage them to get in touch with Flux through the website.”

Contact

For further information about the PIRSA AgTech program:

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Visit pir.sa.gov.au/agtech

For more information about Flux Robotics, visit www.fluxrobotics.ai