National Vegetable Extension Network

VegNET GIPPSLAND

CASE STUDY

September 2024

Gippsland growers pilot the use of drones on-farm

Introduction

VegNET Gippsland, in partnership with Schreurs & Sons, Syngenta and Muirs, hosted a drone spray demonstration night in April 2024. Drones are a significant topic of interest to Victorian vegetable growers with around 60 attendees from 14 vegetable farms embracing the opportunity to see a spray drone in action and talk to growers who have used it.

Oztech Drones showcased the XAG P100 Pro at the event, with owner Jamin Fleming receiving over 10 enquires afterwards. Multiple drones are expected to be delivered to Gippsland growers in 2024.

Daniel (Dan) Hodges from Peninsula Fresh Organics and Steven Covino from Covino Farms are two vegetable growers in Victoria's Gippsland region. Both growers purchased drones following the drone demonstration night and have shared their experiences navigating legislation, licensing and restrictions, and the practicalities of getting a drone set up and working efficiently in-field.

The event on drones aligned with VegNET Gippsland's Annual Plan and the focus areas of smarter growing and innovation; environment and crop health; and building business capacity and a sustainable workforce.

Two drones put to the test in Gippsland

Peninsula Fresh Organics purchased a XAG P100 Pro spray drone to cover their 140 hectares of farmed land.

"We were looking at drones to replace ageing spray equipment and to give us more flexibility on how we spray. We had not made up our mind as we were unsure of how well they spray and the coverage they provide. The event made our decision clear," Dan said.

Dan described the drone as indestructible, with a strong frame and components, and a well thought out design.

"With a large 50 litre tank it can really put out some volume."

Covino Farms purchased a DJI T50 spray drone for their 3800-acre farm to provide flexibility in their spraying program, including being able to spray post-rain fungicides when it is too wet for traditional spray rigs, as well as safely undertaking targeted weed control around embankments.

Steven said the drone had a good camera and avoidance detection system.

"The DJI is a bit more user friendly with its mapping software; an easier drone for non-tech people."

Key messages

- A VegNET Gippsland demonstration night on the use of drones for spray application was a catalyst for growers to embrace the use of this technology in the region.
- Drones are a significant topic of interest to Victorian vegetable growers following a very wet summer that saw substantial crop losses due to extended periods of restricted field access.
- Two vegetable growers who attended the event each purchased a drone to increase their productivity and profitability on-farm. Peninsula Fresh Organics and Covino Farms share what it takes to get a spray drone up and running, including registration, licensing, compliance and in-field setup.
- While there is a learning hump to get started, the benefits of spray drones include more efficient and effective application of products, increased crop accessibility following bad weather, lower up-front machinery costs and a safer working environment.

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Steven explained it was important to speak to people with operational experience before purchasing a drone.

"Get a good understanding of the way you want to operate your drone and then speak to people who understand that."

Dan and Steven both advocate for learning the pros and cons of different drones before deciding on what is right for your farm and, where possible, having hands-on experience.

Image: Participants at the VegNET Gippsland spray drone demonstration night in April 2024. **Credit:** Emily Scott.

Following the rules

Regulations on drone licensing and compliance are changing regularly (see box-out for more information).

As Covino Farms wanted multiple staff to fly their drones, Steven asked a reseller to assist with the drone setup, licensing and training.

"The reseller unboxed the drone, set it all up and did the training and registration with the Civil Aviation Safety Authority with all staff," he said. "The staff did a multi-day training course that covered the application, how to fly the drone, the initial licensing requirements etc."

To complete their certification, staff undertook additional learning modules outside of the initial training block.

For Dan, purchasing the drone was the easy part: "The big two challenges have been the compliance and setting up operations around the drone. They have taken up a lot more time, and a lot more money."

Dan chose to set up his drone and step through the licensing requirements himself, which he described as "a bit of a journey". However, he noted there are many helpful resources and training videos online, particularly from the United States.

Navigating drone licensing and regulations

The Civil Aviation Safety Authority (CASA) – the regulatory body for drones – requires a drone pilot to be appropriately licensed prior to flight.

The pathway to becoming licensed is not particularly clear, with multiple licences and certifications required, including a licence specific to the drone being operated.

A Remote Pilot Licence (RePL) is required to fly an agricultural spray drone and can be obtained through a CASA approved training provider. There are two categories of RePL: <7kg and <25kg.

A RePL includes both theory and practical test components, with the cost varying up to about $2,500 for a <25kg licence. Training providers offer both the virtual and practical training components over different timeframes to suit participants. A RePL course covers topics such as meteorology, map reading and aviation terminology.

The next step in the process is obtaining a <150kg 'type endorsement' on your RePL that is specific to the type of drone you will be flying. A 'type endorsement' can cost an additional $2,000 approximately. At the time of writing, there are only a few companies that can certify a person for the <150kg category in Australia.

In addition to the endorsement on your RePL, many training providers will also suggest that drone pilots obtain their aeronautical radio operators' licence (AROC). An AROC is required to fly in controlled airspace and allows you to broadcast over VHF radio aviation frequencies.

A Remote Operators Certificate (ReOC) may be required, particularly if you are flying in a restricted airspace, at night, or out of line of sight, and involves creating operational procedures and manuals. You are also required to pass a chief remote pilot (CRP) assessment.

It is mandatory for any drone flown for business or as part of your job to be registered with CASA. Specific drone insurance is also required; it is recommended that you seek advice through the drone reseller. It is strongly advised that any farm wishing to use drones should seek appropriate guidance around certification and licensing.

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"It took about half a day, to a day, to set it all up," Dan said. "Mapping out paddocks and areas... has taken a little bit of time to get our heads around the software.

"The Remote Pilots Licence can take weeks to do yourself; it's quite involved and very prescribed. A Remote Operators Certificate (ReOC) is about three more months' worth of paperwork, but it gives you more options."

Some farms in Victoria are also located under restricted airspace, where aircraft movements are reduced to those with certain permissions.

"You have to submit flight plans to the relevant authorities when you are going to fly in a restricted airspace," Steven said. "There are additional requirements and it gets more expensive from a training perspective as well, as higher levels of licence are required, but it is not prohibitive."

Additional licensing to apply chemicals

Legislation is in place to support the use of spray drones for chemical application, with the Australian Pesticides and Veterinary Medicines Authority (APVMA) regulating the use of agricultural chemical products in Australia.

Agriculture Victoria requires additional licences and registrations for those undertaking aerial spraying from a drone in Victoria, including an Agricultural Aircraft Operator Licence (AAOL). A Pilot (Chemical Rating) Licence (PCRL) is also required for those who conduct agricultural chemical spraying in Victoria. Both an AAOL and PCRL come with several operating conditions and costs.

"It means an extra $2,000 or so, and a whole other licensing process," Dan said. "It is essentially an extension to your chemical registration processes."

Field setup and operations

One of the most important considerations for effective and efficient drone operation is a good field setup. Consideration should be given to how the drone batteries will be charged, how the batch tank will be refilled, chemical safety, access to fresh water and transportation around the property.

"You'd be surprised how quickly you can spray a lot of area if you have the right setup and you can do the changeover in a minute or two," Dan said.

When recharging batteries and powering your setup, both Dan and Steven recommended going big on the generator. "The batteries charge quickly, and they pull a lot of power; don't cheap-out on your generator," Dan explained.

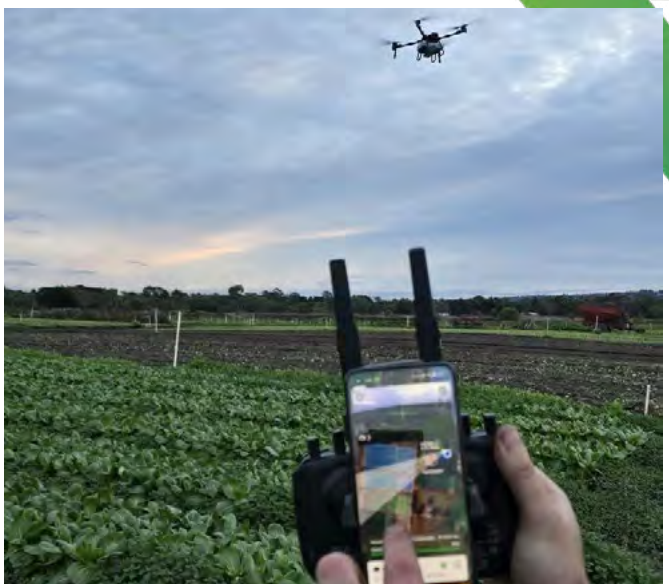

Image: Peninsula Fresh Organics purchased a XAG P100 Pro spray drone following the VegNET Gippsland demonstration event. **Credit:** Dan Hodges

Steven noted that the reseller he worked with provided more detailed advice compared to the drone manufacturer. For example, he was advised to use five batteries rather than the recommended three.

"As the heat cycles over the course of a day, if you're discharging, charging up hard, then only sitting around for a little bit before going again – you are degrading your batteries quicker because they don't get a chance to cool down enough."

Steven identified that weight was a consideration for the in-field setup, with mobility and agility a key requirement to travel between multiple farms: "We are looking at a flatbed truck with generators for charging, plus a 2,000 litre tank and associated pumps."

It's important to note the costs associated with a good in-field setup.

"After buying a generator, setting up a trailer and batching tank ourselves, we could be up for another $15,000," Dan said. "I've heard of people spending up to $30,000 on their drone trailer."

When flying large agricultural drones, you need to be aware of your surroundings, particularly neighbours with animals that might be easily spooked.

"You have to be mindful of what's around you; we talked to our neighbours and made them aware of what we were doing and why," Dan explained.

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Improving grower productivity, profitability, preparedness and competitiveness

Steven purchased both the fertiliser and spray kits for the DJI drone. He said the flexibility and customisation of the spray is a key benefit of using drones at Covino Farms.

"You get a better look at the spray drift; you can open up the nozzle size and have bigger droplets which are less fine," he explained.

"In many ways, you get a better look at the job you are doing with a drone when you are outside the machine rather than inside.

"I was surprised at how accurate the fertiliser was; we were accurate to within 100 grams per acre."

Covino Farms is currently getting around 20 minutes of run time out of a drone battery.

"That includes about three or four passes with fertiliser, and around two when spraying," Steven said. "The turnaround is a lot quicker and more practical than what I was expecting it to be."

Image: The drone in action at Peninsula Fresh Organics. **Credit:** Dan Hodges

Covino Farms is training several staff to pilot their drones. Steven noted that his staff felt safer using drones over traditional spray rigs with respect to the chemical impacts.

"All the staff would much prefer the drone than actual spraying," he said.

"The plan is to get more experience with one drone and once the operators are competent, we can get a second one with the idea that one person can operate two drones simultaneously."

At Peninsula Fresh Organics, the drone has increased on-farm efficiency and productivity.

"We are not running mud up and down, I can spray in muddy conditions without any issues, and I'm not walking over the ground or driving a tractor over muddy ground. In some cases, I'm spraying quicker than a tractor," Dan explained.

On the flip side, using the drone has come with a unique set of challenges.

"I'll be honest and say it took me about a month and a half to get my head around compliance for the drone. It was harder to learn the compliance than it was to learn how to fly the drone," Dan said.

"All-up, compliance and insurance costs can be anywhere from $5,000 to $10,000 for one person to be properly licensed to operate an ag drone."

Dan also believes that compliance hasn't caught up with drone technology.

"It's tricky with the rules as it is a fast-growing market. It's comparative; if you buy a drone for about $50,000 and you spend $10,000 on licensing and $15,000 on a trailer, a tractor costs more if you buy the machinery with all the attachments and a spray unit."

Steven agreed that drones can save growers money in the long-term.

"If you need two drones, and you need a truck, you're still going to be about a third of the cost of a new spray rig," he said.

"Drones are not going to be a 100% solution for everything, but I think they are going to be an important and integral part of farming going forward. Looking at how far they have come and how they have advanced, I think that drones are going to be the future."

Further information

Contact VegNET Gippsland Regional Development Officer Emily Scott at emily.scott@foodandfibregippsland.com.au or 0455 214 102.

Special thanks to Daniel Hodges from Peninsula Fresh Organics and Steven Covino from Covino Farms.

CASA Website - Drones | Civil Aviation Safety Authority (casa.gov.au)

VegNET Gippsland case study: The role of spray drones in vegetable farming