



'Swarm Drone' Technology

The Technology

The XAG P30 Agricultural drone is a remote-controlled aerial spraying system. The drone is equipped with a fully automated flight control system. When combined with GIS data, this system enables the user to spray precisely and only where needed.

A single drone holds 16l of liquid spray and the size and flow rate of the atomized droplets can be easily adjusted to match the spray medium and required coverage rate.

Multiple drones can be flown as a 'swarm', by a single operator, to save time and costs.

The trial

This trial involved qualified operators flying XAG P30 drones consecutively in a 'swarm' formation. Two operators flew four drones to spray herbicide to 40ha of sweetpotato and three drones to spray pesticide to 30ha of lucerne.

Spraying was undertaken during early morning to avoid wind drift and achieve higher application efficiencies.

Findings

The drones performed reliably during the entire trial and were successful in spraying all cropped areas efficiently and effectively.

The 40ha sweetpotato crop was sprayed in four hours, at an application rate of 60l/ha. The grower was unable to deploy traditional tractor-based spray units at this time due to saturated soil conditions. The spraying operation was required immediately to be most effective.

A single drone undertaking this work would take 16hrs and need to be deployed over several morning periods, running the risk of inclement weather and greater weed infestation.

The 30ha lucerne crop was sprayed in three hours at an application rate of 30l/ha. As for the sweetpotato crop, this trial also occurred during inclement weather and the grower was unable to deploy traditional tractor-based spray units.

The wet conditions would have given rise to a rapid pest infestation and the ability of drones to be deployed immediately avoided significant crop losses. A single drone undertaking this work would take 12hrs and need to be deployed over several mornings.

Costs

The unit rate for a single drone / single operator deployment is usually based on a per hour basis. The unit rate for swarm drone deployment is derived on a per hectare basis to allow for the cost of multiple drones and operators.

The cost of the 40ha herbicide / sweetpotato trial was \$65/ha, totaling \$2600. A single drone undertaking this work would take 16 hrs and at \$250/hr, cost \$4000.

The cost of the 30ha pesticide / lucerne trial was \$50/ha, totaling \$1500. A single drone undertaking this work would take 12hrs and at \$250/hr, cost \$3000.

Based on these costs, the grower saved \$1400 and \$1500 respectively by deploying swarm drone technology vs single drone technology. These savings are minor compared to the additional productivity gained by avoiding significant pest infestations, due to prevailing weather conditions. The grower estimated that the deployment of swarm drone technology in a single application period, averted a total crop loss of approximately 30%.

Grower Feedback

Upon trial completion, the grower provided the following combined feedback:

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
I see value in this technology					✓
I intend purchasing this technology					✓
I recommend this technology to other growers					✓
The system provided greater comfort and safety to pickers					✓
I am satisfied with the service and support provided by the AgTech company					✓

The grower also noted the benefits of the swarm drones' portability and local operation base, enabling it to be deployed on short notice.

Based on the results of these trials, the grower continued to deploy the swarm drones for respraying of the trial crops and treatment of new plantings.

Other Considerations

In addition to its obvious cost benefits, swarm drone technology is a safer and healthier option for operators and farm staff. The drones are refilled via an autonomous filling station, avoiding direct human contact with chemicals.

The capacity of drones to be used in all weather conditions also avoids the risk of inoperability of traditional land-based equipment during inclement weather.

Further Information

For further information on this trial, including details of participating growers, please contact:

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