

Fact sheet

Drones for monitoring sheep welfare at lambing – Enhanced Producer Demonstration Site (PDS)

Are drones all they are cracked up to be? Can they save time and money monitoring sheep welfare?

These are the types of questions the Boort BestWool/BestLamb (BWBL) group wanted to find out during the three-year 'Using drones on-farm to monitor sheep welfare' demonstration. The demonstration was set up in early 2019, with funding from Meat & Livestock Australia (MLA) and Agriculture Victoria.

See the drone in action: connection.vic.gov.au/farmers-add-drone-pilot-to-skill-set

Background

The use of technology to save time and labour is an increasing area of interest for farmers. With drones being used more frequently in agriculture and advertised as the 'next best technology farmers should have', the Boort BWBL farmers wanted to see if a drone could be used to save time spent monitoring sheep welfare during lambing.

At the time, there was little to no information available about using drones to check livestock, particularly sheep. To fill this knowledge gap, the Boort farmers decided to evaluate drone practicality and usefulness by monitoring sheep welfare at lambing and at other critical times in the year to see if the technology reduced time and labour costs normally associated with these tasks.

Prior to the trial taking place, there was also no information available to suggest which drone might best suit the needs of the farmers or how to use one around sheep. Drone suppliers and farmer observations during the trial were relied upon to identify the most appropriate drone and process for checking and monitoring sheep welfare.

Nine producers from the Boort group were directly involved in the trial. With lambing occurring from autumn through to spring, the drones were moved from one property to the next according to their lambing schedule.

The demonstration

The objective was to assess the practical use of drones to remotely monitor sheep welfare during lambing and at different times in the year. A GoPro drone, followed by the addition of two DJI drones – a Phantom Pro and Mavic Pro – were used during the demonstration. These were all off-the-shelf commercial sub-two-kilogram drones.



Figure 1: Drone in flight, checking ewe and lamb welfare.

More than 150 videos were recorded from the drones across three lambing periods (2019, 2020 and 2021) and two summer periods (2019 and 2020). Video footage from the drones clearly showed when sheep were standing still or moving in response to the drone and at what height or speed this occurred.

Sheep generally ignored the drone when it was traveling slowly or hovering above 30m. The sheep moved away from the drone when it was travelling at speed at any height – which the farmers believed was due to the sound of the drone. In the final year of the trial, farmers approached ewes and lambs with the drone at a lower height (8–15 meters) to see if they would ignore the drone. The sheep were observed to not move away from the drone if approached very slowly.

The ability of a drone to undertake other activities during other times of the year was also trialed. One farmer found the drone very useful for checking irrigation channels and looking at how far the irrigation water had moved through a paddock. Others used the drone to look at summer and winter pasture, fences, water troughs and dams. These activities were mostly undertaken quickly and effectively using the drone.

Weighing up the technology

The drones used in this trial were found to be useful for undertaking some tasks on-farm quickly and effectively, such as trough checks. While drones may hold some benefit for checking ewe and lamb welfare at lambing, the lack of zoom ability on the camera, short battery life and frequency of losing visual line-of-sight in the large lambing paddocks did impact their use for this task.

Newer drones like the DJI drones can travel up to 5km from the operator, although it is a Civil Aviation Safety Authority (CASA) requirement that the operator must always have visual line-of-sight. Some of the Boort lambing paddocks exceeded the visual line-of-sight requirement.

Today, however, drone technology has progressed to a point where some of the limitations identified in the trial would not exist. For example, drone cameras have zoom capability, enabling the farmer to fly the drone quickly at height and still have a good view of ground-level items. Furthermore, new drones can fly for up to 45 minutes compared to the 15 minutes they could fly on the trial.

Key outcomes

- The benefits and limitations of the drones to check sheep welfare at lambing and to undertake other activities on-farm were identified and documented. Many summer activities were undertaken quickly and effectively.
- Using a drone (any of the brands used in the trial) did not reduce the time and labour costs associated with checking ewe and lamb welfare during lambing due to mainly camera and battery limitations. Newer drones now have cameras that can zoom, which may negate the limitations observed during this trial.
- The trial achieved significant extension success with local, national and international media and farmer and industry interest, providing a platform to inform people about the usefulness of drones on-farm to check sheep welfare at lambing.
- The trial allowed farmers to test a new type of available ag-tech and gain skills and experience in using drones.
- Development of considerations when purchasing a drone for on-farm use, including whether the camera zooms, battery life, how best to fly it around sheep and the impact of CASA rules.

Things to consider

- The Civil Aviation Safety Authority (CASA) outlines the rules people need to know to fly a drone in Australia at casa.gov.au/drones



Figure 2 Sheep captured from a drone while grazing.

- Do not place a drone on any metal objects (such as the back of a ute) for take-off. The metal interferes with the GPS system of the drone.
- Launch and land the drone in a bare area as long pasture or crop can catch the propellers and damage the equipment.
- Have extra batteries to ensure longer flying time.
- Have extra propellers in case of damage.
- If purchasing an older drone, check battery flight times as older batteries tend to have shorter flying times.
- Identify if the drone camera has zoom capability as it will be easier to see items at ground level, without needing to lower the drone and potentially disturb livestock.

Technology requirements

- If the drone does not come with a ground-based controller, an app can be used to fly the drone.
- Although an app can be operated offline, GPS signals are used to fly the drone. Consequently, the app is more accurate while connected to the mobile network.
- A dashboard is required to see a telemetry overlay of drone flights outside of the app or ground controller.

Where to find out more

- View the Civil Aviation Safety Authority (CASA)'s guidelines on drone use at casa.gov.au/drones
- Watch the demonstration video at connection.vic.gov.au/farmers-add-drone-pilot-to-skill-set
- Find out more about the group and trial at agriculture.vic.gov.au/_data/assets/pdf_file/0007/857347/GroupProfile-BWBL-Boort-April-2022.pdf

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