

# Evaluating an Intelligent Sprayer in an Iowa Apple Orchard

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## Introduction

The Intelligent Sprayer uses light detection and ranging (LiDAR) technology to apply pesticides to tree crops with greater accuracy than standard airblast sprayers. LiDAR uses a laser scanning sensor (**Figure 1**) to construct a 3-D image of the tree that guides individual nozzle outputs.

Adequate spray coverage helps to ensure optimal pest and disease control. Spray coverage is measured using water-sensitive paper cards (**Figure 2**). Spray uniformity is a standard goal for apple growers, but 100% coverage is wasteful.

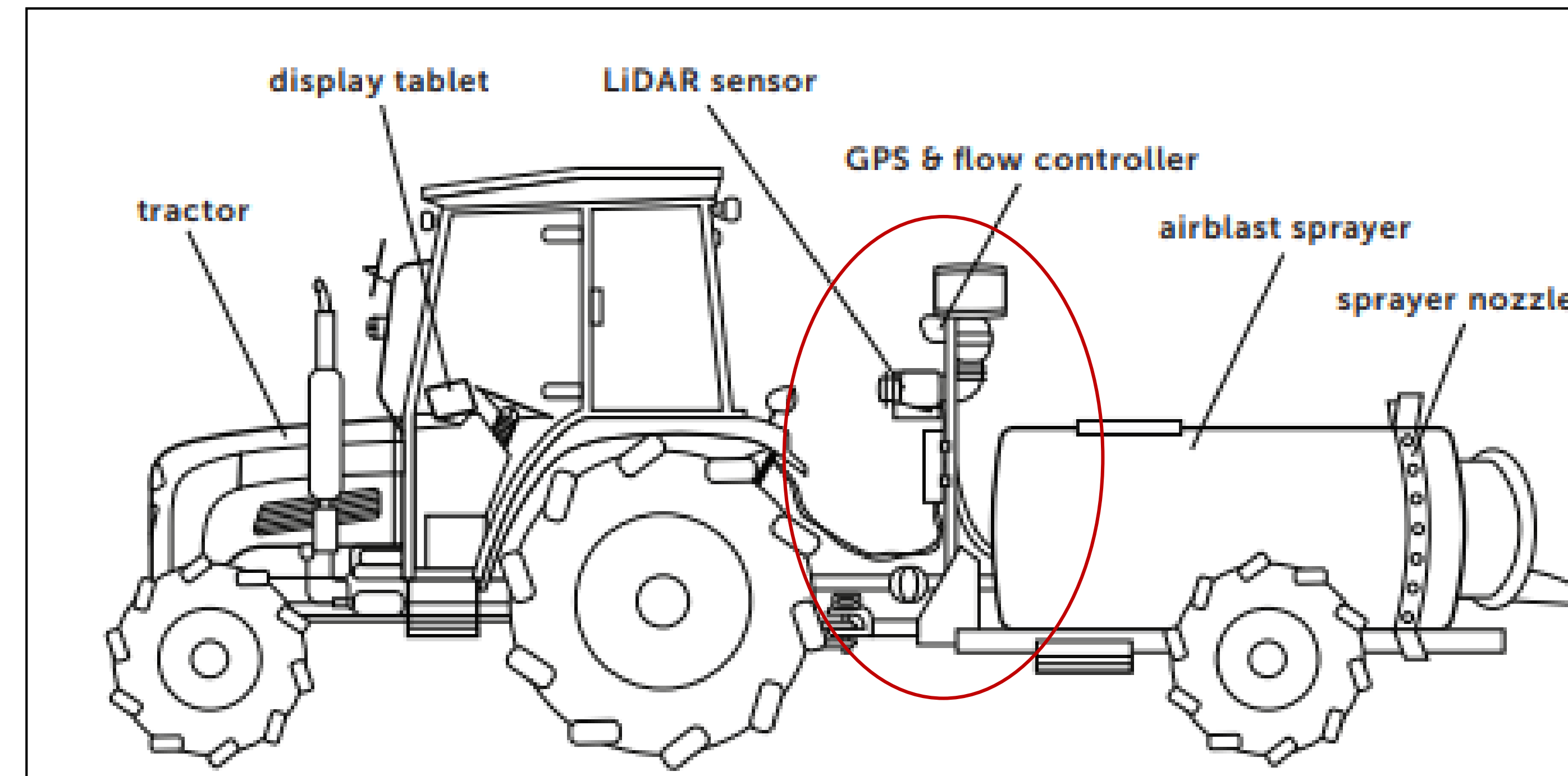
Intelligent Sprayer technology can conserve pesticides by reducing the amount of spray applied per hectare (aka spray volume) while delivering spray coverage that is adequate for controlling diseases and pest insects.

## Objectives

In field trials in Iowa, determine:

- Efficacy of disease and pest control when using the Intelligent Sprayer.
- Reduction in spray volume per application.
- Minimum percentage of spray coverage that achieves adequate pest and disease control.

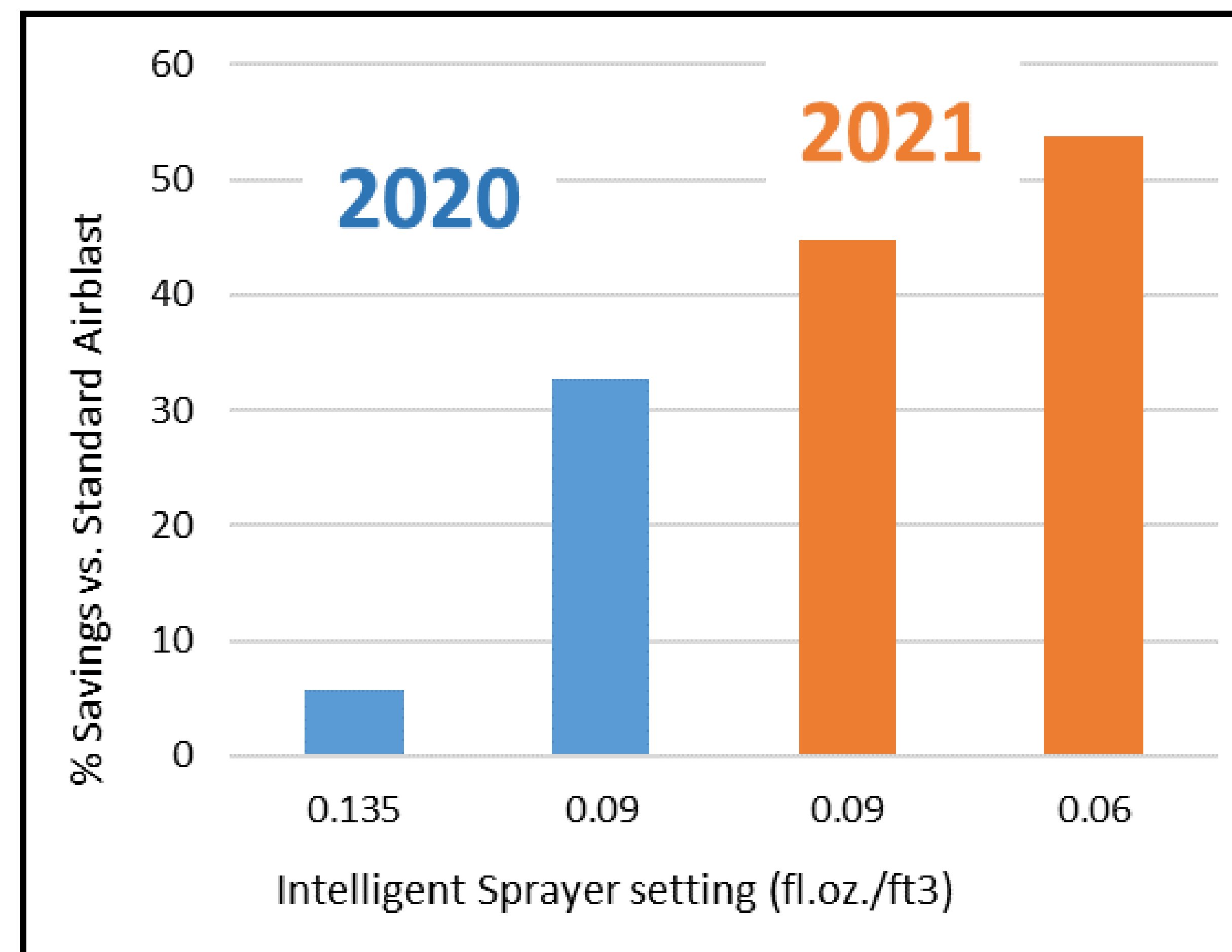
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**Figure 1.** Intelligent Sprayer system retrofitted (see circle above) to a conventional airblast sprayer.



**Figure 2.** Water-sensitive paper card (for quantifying spray coverage) in an apple tree after a spray application.



**Figure 3.** Average % spray volume savings of Intelligent vs. standard airblast sprayer in an Iowa orchard.

## Summary

- **2020:** Intelligent Sprayer reduced spray volume by >30% compared to standard airblast at lower flow rate setting (0.09 oz/ft<sup>3</sup>) (Figure 3).
- **2021:** Intelligent Sprayer reduced spray volume by >50% compared to standard airblast at lower flow rate setting (0.06 oz/ft<sup>3</sup>) in 2021 (Figure 3).
- **No loss of insect or disease control.**