

A SMART APPLY CASE STUDY:
ALMOND AND PISTACHIO FIELD EVALUATIONS

Labor Saving | Chemical Savings | Sustainability

THE OPPORTUNITY

Chemical application is one of the costliest orchard operations in almond production. During hull splits, growers must manage high navel orangeworm pressure along with other pest and disease concerns, while maintaining whole-canopy coverage with tank mixes that can be costly. Conventional air-blast sprayers apply material uniformly, even across areas of sparse foliage, creating a clear need for a more efficient approach that can reduce unnecessary spray volume without sacrificing crop protection.

American Pistachio Growers and USDA-ARS began evaluating the Smart Apply Intelligent Spray Control System™ with LiDAR technology in pistachio orchards to determine whether pesticide use could be reduced while maintaining performance. The work was then expanded into a mature commercial almond orchard, where researchers evaluated whether Smart Apply could match spray output to canopy presence, reduce total applied volume, and maintain effective coverage and navel orangeworm control under commercial hull-split conditions.

THE SOLUTION

Smart Apply LiDAR technology uses canopy sensing to detect foliage and activate individual nozzles only where vegetation is present, adjusting spray output in real time rather than applying a uniform volume across the entire row. American Pistachio Growers and USDA-ARS first evaluated the technology in bearing pistachio orchards. The work was then expanded into a mature California almond orchard, where Smart Apply with LiDAR active was compared with the same sprayer operating without LiDAR and a conventional Air-O-Fan sprayer across two hull-split applications.

The evaluations measured total spray volume, canopy coverage, and navel orangeworm control. In pistachios, Smart Apply reduced pesticide use by 55–60% in mature orchards and by as much as 85–95% in younger orchards, where lower canopy density created greater opportunities for spray savings. In almonds, Smart Apply reduced total spray volume by 35% while maintaining equivalent coverage and statistically comparable navel orangeworm mortality through 21 days. Across the two almond applications, reduced chemical use also delivered approximately $66 per acre in chemical input savings.

JOHN DEERE Smart Apply®

AT A GLANCE

Study Authors and Affiliations:

BELKORP AG

Belkorp Ag
USDA-ARS
American Pistachio Growers
Terra Linda Farms
Markarian Ag Enterprises

Crops Evaluated:
Bearing Pistachio Orchards
Mature Almond Orchard

Almond Study Location:
Southern San Joaquin Valley, California

Almond Trial Design:
Two Hull-Split Applications Comparing Smart Apply LiDAR “On,” LiDAR “Off,” and a Conventional Air-O-Fan Sprayer

Measurements:
Total Spray Volume
Canopy Coverage
Navel Orangeworm Control

Technology:
Smart Apply Intelligent Spray Control System™

Key Results:

- 55–60% Spray-Volume Reduction in Pistachios
- 69% Average Savings for Pistachios: 77.5% Juvenile Pistachios, 59.9% for Mature Pistachios
- 35% Spray-Volume Reduction in Almonds
- Approx. $66/Acre in Chemical Input Savings Equivalent Coverage and Navel Orangeworm Control.

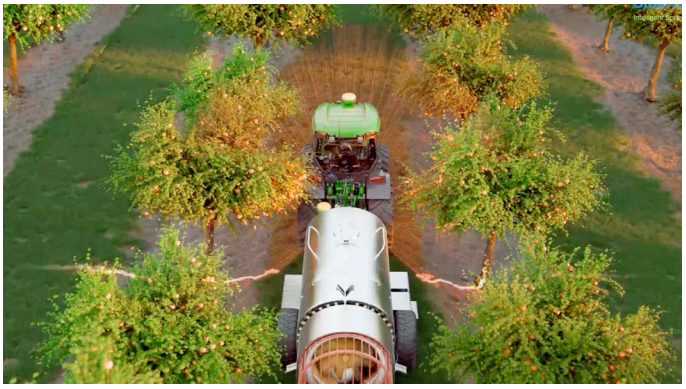
Scan to Read Full Case Study

https://apgpower.americanpistachios.org/q2-2026/#sustainability



“The results validate that canopy-sensing sprayers can maintain full coverage and Navel orangeworm control while lowering chemical, labor, and energy inputs.”

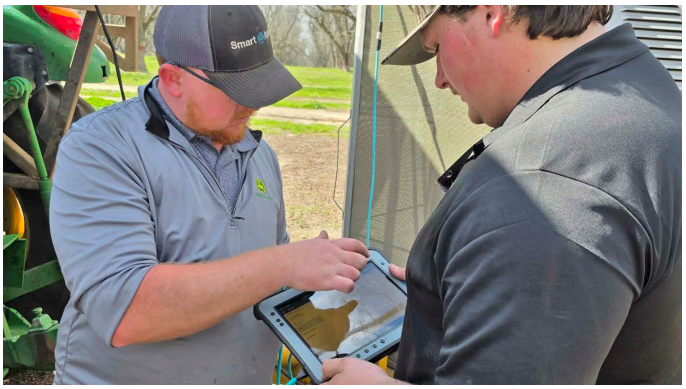
Evaluation of the John Deere Smart-Apply LiDAR Sprayer in Almonds



Smart Apply uses LiDAR to identify individual tree geometry before applying chemicals.



Each tree is sprayed without operator intervention. The system stops when no tree is detected.



Program the entire day of spraying at one time on the Smart Apply tablet. Track job progress in real time.



System creates and archives a digital document on chemical savings, tree counts, rows/tracts sprayed and more.

About the Smart Apply® Intelligent Spray Control System™

Sold as a kit that can be retrofitted onto any new or used air blast, over-the-row or automated sprayer, the Smart Apply System delivers precision spraying and data collection and reporting in one easy-to-use tool. It is designed to help growers of specialty crops and nurseries reduce reliance on chemicals while maintaining yields, lower costs on chemicals and labor, and protect the sustainability of orchards, vineyards and nurseries. The Smart Apply System can be integrated with the Deere Operations Center for more benefits. **Learn more at www.SmartApply.com**



Up to 67% Reduction in Chemical Costs



Up to 93% Less Water & Chemical Run Off



Up to 87% Less Airborne Drift

Find an Authorized Smart Apply Dealer Near You