

Increasing Environmental, Economic and Social Sustainability

The multi-disciplinary tree fruit team works with stakeholder advisors to implement research-based programs to ensure a production-to-consumer system that is environmentally, economically, and socially sustainable.

Focus on Industry Priorities

- Advanced Integrated Pest and Cultural Management
- Innovative Technologies
- Next Generation Growers from Diverse Backgrounds



Adoption of Sustainable Practices and Technologies

337 tree fruit producers representing over 31,000 acres of orchards told us in post-program surveys how their interaction with Extension impacts their operations.

- 86%, 84% and 60% indicated their management of diseases, insects/mites and crop load, respectively, improved as a result of extension meetings, newsletters, and/or pest alerts
- Growers estimated the economic impact to be \$126, \$112 and \$142 per acre for improved management of diseases, insects/mites and crop load, respectively
- 61% adopted a new disease management strategy; 41%, a new weed management practice; 57%, a new insect management strategy; 48%, a measure to better comply with the new worker protection standard
- 85% of Latino growers indicated they adopted a new practice as a result of Extension's interactive, bilingual training on sustainable fruit production



- 96% of young grower participants told us they feel better equipped to contribute as "next generation" members of the fruit industry as a result of YGA educational programming; 62% felt more confident about taking on an industry leadership role; 53%, diversifying their crop production; 46%, trying new labor saving or precision management technologies
- The placement of 8 Ag-Information Centers or kiosks at area produce auctions has provided plain sect growers the opportunity to access relevant pest management information in a timely fashion (<https://news.psu.edu/story/523118/2018/05/25/impact/penn-state-extension-kiosks-produce-auctions-provide-information>)



Team Video: <https://extension.psu.edu/extension-tree-fruit-team-putting-knowledge-to-work?>



Regional and National Leadership

Extensive monitoring programs developed by Penn State entomologists allow growers to eliminate at least 50% of direct BMSB treatments. In 2018, the attract and kill method in the form of "ghost traps" eliminated the need for direct insecticide applications (\$12 to \$41 per acre per spray) against BMSB.

Engineering Solutions for Specialty Crops

Innovations supported by USDA NIFA, PDA, and Penn State innovation grants include:

- pruning aids and sensors for future pruning automation
- technologies to increase harvest efficiency

Robotic pruning investigations have led to the development of simplified rules and a pocket guide that growers can apply now to increase efficiency of pruning. Growers said use of the sequential pruning techniques would likely cut pruning time by 42%—an estimated savings of \$136 per acre. Harvest efficiency is increased by 30% with harvest-assist systems matched to “fruiting wall” orchard production systems.



Economic Impacts of Extension Outreach and Applied Research

- 1) 30-50% reduction in broad spectrum synthetic fungicides (~ \$185 per acre), while still practicing fungicide resistance management, as a result of incorporating potassium bicarbonate into early season fungicide rotation
- 2) Savings of \$220,500 to \$555,660 in commercial pesticide applications per year as a result of education on banding for spotted lanternfly control
- 3) Development of a fruit counting algorithm with 97% accuracy for early season prediction of fruit yield, a technology valued at ~\$35,000 by a focus group of apple producers



- 4) Increased precision management, with over 90% of new orchards now planted on dwarfing rootstocks that increase net cumulative returns by \$20,000 per acre
- 5) Improved labor efficiency, resulting in net returns of \$200 to \$1200 per acre



Bilingual Courses for a Next Generation of Horticulturists

Bilingual certificate short courses were offered for growers with potential interest in becoming specialized managers or start-up farmers:

- 74% improved pruning and crop load management skills
- 84% improved integrated pest management scouting

<https://extension.psu.edu/integrated-pest-management-ipm-in-apple-orchards?>

<https://extension.psu.edu/integrated-weed-management-weed-scouting-for-fruit-production?>

- 86% plan to adopt new practices to improve food safety

Extension Tree Fruit Team Members

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