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

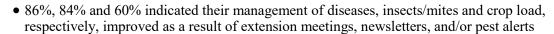
- Advanced Integrated Pest and Cultural Management
- Innovative Technologies
- Next Generation Growers from Diverse Backgrounds



2018

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.



- 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-teamputting-knowledge-towork?



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

Co-Chairs: Rob Crassweller, Kari Peter; Members: Tara Baugher David Biddinger, Tim Elkner, John Esslinger, Montserrat Fonseca Estrada, Tom Ford, Greg Krawczyk, Long He, Rich Marini, Andy Muza, Kari Peter, Bob Pollock, Jim Schupp, Don Seifrit, Daniel Weber; Affiliates: Tanner Delvalle, Kathy Demchak, Jayson Harper, Paul Heinemann, Lynn Kime, Luke LaBorde, Dana Choi, Program Director: Mike Masiuk