

Project Title: Sustainable Fruit Production and Marketing **Website:** <http://ag.umass.edu/fruit>

Project Leader: Sonia Schloemann, umassfruit@umass.edu

Team Members: Wesley Autio, Jon Clements, Daniel Cooley, James Cronk, Elizabeth Garofalo, Duane Greene, Kristen Hanley, James Krupa, Shawn McIntire, Elsa Petit, Jaime Piñero, Hilary Sandler, Katherine Ghantous

Project Overview

Fruit farms and vineyards provide open space and scenic vistas that add significantly to the quality of life in Massachusetts. The lands surrounding agricultural production provide buffer zones for native species of plants and animals and corridors for their movement or expansion. To remain a vital part of the Massachusetts economy, both new and established growers must learn to produce crops sustainably and to adapt production systems to market opportunities. New varieties provide fruit farmers with opportunities

for enhancing production, quality, sales and consumption. Delivering appropriate research-based information on new and alternative fruit species and varieties, advanced horticultural management techniques, marketing and business management strategies, pest-ecology, and pest-management procedures that addresses the current needs of Massachusetts fruit growers is critical to the UMass Extension Fruit program to fulfill its mission and deliver high-quality services. Research on pest ecology and management informs approaches that optimize control, reduce chemical use and increase fruit quality. The knowledge and resources provided by Extension forge successful partnerships with Massachusetts' fruit producers that, in turn, foster a more secure, diverse and healthful food supply for the Commonwealth.



→ In 2019, the fruit team

hosted, organized and presented research based information at 38 events across New England and the Northeast. At these events, we shared vital information ranging from invasive insect pest management to time sensitive horticultural guidance to climate mitigation strategies and integration of cutting edge agricultural technologies.

→ We conducted 19 different on-farm research and demonstration projects and another 22 applied research projects. The fruit team's projects addressed research needs such as innovative trap-tree and 'ghost trapping' methods for

UMass Extension Fruit Program Summary of Activities and Outputs 2019

Activity	Occurrence	Number of People Reached
Classes & Tours	35	1,191
Diagnostics & Consultations	--	1,160
Publications	162	3,768
Research & Demonstration Projects	41	1,590
Workshops, Conferences, Presentations	38	4,437





controlling native and invasive fruit pests, apple and peach rootstock performance evaluations, precision thinning, optimizing cider apple production for high value markets, the effect of shoot and cluster thinning on wine grape juice quality and many more.

→ Fruit team members produced and maintained 162 publications. Those publications include newsletters and production guides, fact sheets, reports, abstracts and articles (both in refereed journals and in industry publications). An archived library of works by multiple team members continues to provide reference material to growers, service providers, gardeners, students, and

educators in the field. Additionally, team members also served on numerous editorial and review boards.

- Over 1,100 individual consultations and/or diagnostic services were performed providing fruit growers with information essential to their success in changing climate and growing conditions. The phone calls, site-visits, and email correspondence permitted fruit growers to employ up-to-date protocols and preemptive strategies on their farm.
- Social media significantly widened the team's audience. The UMass Fruit Team website (UMass Fruit Advisor), when linked together with social media platforms (twitter, Facebook, Instagram), extended the team's collective impact by making it available to over 10,000 people who may not have been able to attend workshops or other programs. This, along with all other high quality outputs, is a vital part of sustainability and the production of safe, affordable fruit.

Selected Grants Awarded (primary or as sub-award):

Bradshaw, T., **D. R. Cooley, J. C. Piñero, E. W. Garofalo**, *New England Cider Apple Program: Optimizing Production for High-Value Markets*. NE-SARE Research & Education. 9/1/19-8/31/21 \$229,314 (MA- \$75,728)

Goodell, B., E. L. Petit, *Role of LMW fungal metabolites in Eutypa Dieback*. American Vineyard Foundation 119-1095. 9/1/19-8/31/21. \$70,000.

Greene, D. W., *Use of Metamitron on Influencing Abscission of Apple Fruit* \$9,000

He L, Decker E, **Autio W. R.**, Xiao H, *Barcoding juice quality using SERS, simultaneous determining the content of phytochemicals and adulterants*. 1/1/2018 - 12/31/2021, \$498,838

Mupambi, G. G., **H. A. Sandler, D. W. Greene** and K. Demoranville. *Improving Fruit Quality in Cranberry: Focus on Color* 5/1/19-4/30/23 \$11,395

Piñero, J. C., *Multi-cultivar grafting: a novel low-cost, grower-friendly Attract-and Kill approach to manage key apple pests in New England*. USDA-NIFA Crop Protection and Pest Management Program. 9/1/19-8/31/23. \$324,246

Piñero, J. C., S. G. Schloemann, T. Simisky, E. W. Garofalo, J. M. Clements. *Invasive insect pests threatening specialty crops in Massachusetts*. Mass. Department of Ag. Resources. 9/1/2018-8/31/2020. \$40,700.

Piñero, J. C., T. C. Leskey, D. Shaprio-Illan, H. Faubert, M. Concklin and G. Hamilton. *Developing a mult life-stage management strategy for apple maggot, a persistent tree fruit pest in the Northeast, through the integration of attract-and-kill and biological control*. USDA-NIFA Crop Protection and Pest Management Program. 9/1/2018-8/31/2021 \$324,854

Sandler, H. A., K. Campbell-Nelson, and **J. Clements**, *Supporting IPM on Massachusetts Specialty Crop Farms through the Integration of Applied Research and Extension Outreach*. USDA-NIFA, Extension Implementation Program. 9/1/17 - 8/31/2020. \$867,007



Selected Publications:

- Bolton, L.G., **J. C. Piñero**, and B. A. Barrett. 2019. *Electrophysiological and behavioral responses of Drosophila suzukii (Diptera: Drosophilidae) towards the leaf volatile β -cyclocitral and selected fruit ripening volatiles*. Environmental Entomology (in press).
- Clements, J. M., W. R. Autio**, M. Muehlbauer, W. Cowgill. 2019. *Update on the 2014 NC-140 Honeycrisp and Aztec Fuji Rootstock Trials in New Jersey and Massachusetts*. Fruit Notes 84 (2) pp 15-18.
- Cooley D. R.**, and Harriman, Inc. 2019. *The Impact of Climate Change on Agriculture*. Massachusetts Municipal Vulnerability Preparedness Program Proceedings. 41 pp.
- Follett, P.A., **J. C. Piñero**, S. Souder, L. Jamieson, B. Waddell, and M. Wall. 2019. *Host status of 'Scifresh' apples to the invasive fruit fly species Bactrocera dorsalis, Zeugodacus cucurbitae, and Ceratitis capitata (Diptera: Tephritidae)*. J. Asia-Pacific Entomol. 22: 458-470
- Garofalo, E. W., D. R. Cooley**. 2018. *When Weather Goes Wrong: Managing Apple Scab Under a Changing Climate*. American Phytopathological Society. Plant Health Instructor Case Study. <https://www.apsnet.org/edcenter/foreducators/TeachingNotes/Pages/WeatherGoesWrong.aspx>.
- Garofalo, E. W., D. R. Cooley, J. M. Clements**. 2018. *RIMpro and Apple Scab in New England: Accuracy and Grower Adoption*. New York Fruit Quarterly. New York Horticultural Society. Vol. 26. No. 4. Pp 14-16.
- Giorgio, T., L.S. Adler, and **H.A. Sandler**. *Differential response to azoxystrobin by Colletotrichum species isolated from Massachusetts cranberries*. Plant Health Progress (under review).
- Greene, D. W.** *Benefits of Using High Rates of ReTain on Honeycrisp*. 2019. American Fruit Grower 139(8):18-19.
- Greene, D. W.** *Evaluation of Metamitron as a Chemical Thinner for Apples*. 2019. Horticultural News 99:8-10
- Kon, T., J Schupp and **D. W. Greene**. *Influence of BA and NAA and blossom thinning on thinning of Gala apples*. HortScience (In Press)
- McArtney, S., J. D. Obermiller, J. Racsko, **D. W. Greene** and S. Drahn. *Evaluation of Trunk Injection as a Method for Delivering Fruit Thinning Agents to Apple Trees*. HortScience (In Press)
- Piñero, J.C.**, Barrett, B.A., Bolton, L.G., and Follett, P.A. 2019. *β -cyclocitral synergizes the response of adult Drosophila suzukii (Diptera: Drosophilidae) to fruit juices and isoamyl acetate in a sexdependent manner*. Scientific Reports 9:10574.
- Reighard, G.L., **W.R. Autio**, et al. 2018. *Rootstock performance in the 2009 NC-140 Peach Trial across 11 states*. Acta Hort. 1228:181-186. <https://doi.org/10.17660/ActaHortic.2018.1228.27>.
- Reighard, G., **W.R. Autio**, et al. 2020. *Nine-year rootstock performance of the NC-140 Redhaven Peach Trial across 13 states*. J. Amer. Pomol. Soc. ACCEPTED FOR PUBLICATION.
- Sandler, H.A.** 2018. *Weed management in cranberries: A historical perspective and a look to the future*. Agriculture Special Issue: Recent Advances in Horticultural Practices for Berry Crops, 8(9), 138. DOI: 10.3390/agriculture8090138.
- Zeng, Q., **D. R. Cooley**, N. Schultes. 2019. *Use of Biological Controls and Sterilants as Alternatives to Streptomycin Against Fire Blight Blossom Infections in Apples*. Fruit Notes 84 (3) pp 1-6.

Guides & Newsletters

	#
<u>2019 27th Annual March Message</u> - J. C. Piñero, D. R. Cooley, D. W. Greene	190
<u>2019 New England Tree Fruit Management Guide</u> - J. M. Clements, General Editor	250
<u>2019 New England Small Fruit Management Guide</u> - S. G. Schloemann, General Editor	800
Fruit Notes Quarterly (http://umassfruitnotes.com/)	130
Healthy Fruit Newsletter (http://ag.umass.edu/fruit/healthy-fruit-archive)	165
IPM Berry Blast (http://ag.umass.edu/fruit/ipm-berry-blast)	508
Cranberry Station Newsletter (http://ag.umass.edu/cranberry/newsletters)	226



Selected Collaborations and Working Groups:

- European Apple Disease Working Group (International)
- Great Lakes Fruit Workers (Upper Midwest)
- NE-1720 Multi-state Evaluation of Winegrape Cultivars & Clones
- NC-140 Regional Rootstock Project, Technical Committee (National)
- Northeast Berry Call-In (USDA Region I/Eastern Canadian Provinces)
- Northeast Plant Growth Regulator Working Group (Northeast)
- Organic IPM Working Group (Eastern US)
- Spotted Wing Drosophila Working Group (Eastern US)
- Northeast Tree Fruit IPM Working Group (Northeast)
- Network for Environment and Weather Applications
- UMassAir 5-College Collaborative with UMass Transport Center (Local)

Total educational contacts

	<u>Adult Contacts</u>
In Person	9,997
Indirect Contacts (Print, Web, etc...)	14,268

Narrative Summary

The UMass Extension Fruit Team seeks to introduce new ideas, technologies and techniques for fruit production in New England, provide timely relevant & research-based information to our audiences that is ecologically and economically sound, respond to current issues effectively and efficiently, and alert growers to high impact issues if/when they occur. We work with fruit growers from small- and large-scale operations who range from beginners to experienced growers and use organic to conventional production systems to produce a variety of fruit crops ranging from apples to strawberries. Fruit Program activities are carried out statewide and also regionally around New England and are delivered via workshops, field days and trainings, conferences and meetings, individual consultations, newsletters, factsheets and pest alerts, guides and other publications. As a result of this work our track record includes: reduced pesticide use on fruit crops, increased use of ecologically-based IPM strategies including biological controls and reduced-risk pesticide materials, introduction of new crops and production systems such as growing seedless table grapes and the introduction of high density apple production systems.

Collaborating Organizations:

- US Department of Agriculture
- Massachusetts Department of Agricultural Resources
- Massachusetts Fruit Growers' Association
- New England Vegetable & Berry Growers Association
- Massachusetts Farm Winery & Growers Association
- Massachusetts Cultivated Blueberry Growers Association
- Massachusetts Horticultural Society
- Massachusetts Master Gardeners Association



The Center for Agriculture, Food and the Environment and its units are equal opportunity providers and employers, United States Department of Agriculture cooperating. Contact your local Extension office for information on disability accommodations. Contact the State Center Director's Office if you have concerns related to discrimination, 413-545-4800 or see ag.umass.edu/civil-rights-information/civil-rights-information-resources.