

Michigan Tree Fruit Commission

2017 LEGISLATIVE REPORT



Michigan Tree Fruit Commission



DIRECTOR'S MESSAGE

After three years of operation, the Michigan Tree Fruit Commission (MTFC) has made great strides in improving the research capacity, infrastructure and outreach capabilities of Michigan State University (MSU).

In 2014, growers from the apple, cherry, peach and plum industries together used Public Act 232 and entrusted MSU with the responsibility of answering the key questions facing fruit-growing operations. That partnership, combined with significant financial support from the State of Michigan, has provided nearly \$3 million thus far to help secure the future of the tree fruit industry in our state.

MSU has four off-campus facilities across the state that host tree fruit research: the Clarksville Research Center in Clarksville, the Northwest Michigan Horticulture Research Center in Traverse City, the Southwest Michigan Research and Extension Center in Benton Harbor, and the Trevor Nichols Research Center in Fennville.

At MSU, years of declining funding manifested in several ways, especially with regard to research infrastructure. MSU AgBioResearch conducted a study in 2013 that showed a correlation between the funding decrease and significant needs for infrastructure and staff.

The study indicated to those involved that we had to find innovative ways of approaching our research efforts if we wanted to maintain a strong industry.

We're happy to say that in the years following the commitment to form the MTFC, it has been a resounding success.

At the four research centers, tractors, sprayers, orchard platforms, deer fencing, irrigation system upgrades, pruning equipment and much

more have been purchased. The MTFC has also solicited donations from agribusinesses that have provided much-needed equipment and pesticides.

Additionally, a large investment was made in a small-scale apple grading line for use by researchers and MSU Extension educators. The purchase also received support from the Michigan State Horticultural Society, the Michigan Apple Committee and MSU.

The MTFC has assisted MSU in filling faculty and staff positions in the form of helping with funding for needed equipment and initial support.

Todd Einhorn and Courtney Hollender joined the Department of Horticulture in 2016; MSU Extension added a tree fruit educator in West Michigan, David Jones; and Marisol Quintanilla was hired as a nematologist in the Department of Entomology.

We understand that specialty crops such as tree fruit receive relatively little private sector support for research, so we rely on our growers and on public research.

It's been a privilege to work alongside growers, commodity organizations and MSU, and we look forward to continually addressing grower needs moving forward. Thanks to all our partners for making the MTFC possible.

Jim Nugent
Chair, Michigan Tree Fruit Commission



Jim Nugent

MTFC funding supports research projects, enables collaborations

In 2017, the Michigan Tree Fruit Commission (MTFC) helped initiate several research projects in the lab of Courtney Hollender, assistant professor in the Michigan State University (MSU) Department of Horticulture. In addition to providing generous lab start-up funds that enabled her to build a team of student and postdoctoral researchers, the MTFC supported two experiences that will lead to collaborations with tree fruit researchers across the country.

In June, the MTFC funded a trip for Hollender to meet with several scientists at the New York State Agricultural Experiment Station in Geneva, New York. There were two goals:

- To learn more about the current cutting-edge research going on at this joint Cornell University/U.S. Department of Agriculture (USDA)–Agricultural Research Service research station
- To find shared interests and potential ways to collaborate with scientists now or in the future.

Hollender had extensive discussions with the acclaimed apple breeder Susan Brown and toured Brown's impressive, diverse and world-famous apple germplasm collection. Both scientists are eager to work together

on projects exploring genetics of apple tree architecture. Orchards today are rapidly transitioning to high-density production systems, but these systems are costly. Studying the biology behind tree shape may reduce these costs by helping to breed elite varieties with architectures that are easily amenable to high-density growing.

Hollender also spent time meeting with the rootstock breeder Gennaro Fazio, touring field trials and seeing ingenious aeroponic growth systems for visualizing apple roots. Breeding for root architecture is just as important as shoot architecture for high-density systems. In addition to influencing water and nutrient uptake and tree stability, rootstocks can also influence scion shoot architecture. Hollender foresees developing future collaborations with Fazio. She also met with and learned from scientists Awais Kahn and Lailiang Cheng, among others.

In addition to the trip to Geneva, the MTFC funded Hollender Lab postdoc Joseph Hill to attend the Armillaria Summit at the University of California–Davis. *Armillaria* is a deadly fungal pathogen that can kill cherry, peach and almond trees within a few years of infection. It is nearly impossible to remove from the soil once established.



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In response to a need identified at a RosBREED meeting, USDA scientist Dan Kluepfel organized the summit to bring together fruit tree scientists from around the country to discuss what is known about *Armillaria* in *Prunus* species and come up with a team-based strategy to study the pathogen and develop resistant germplasm. Approximately 40 scientists, Extension specialists and industry representatives were present, including MSU tart cherry breeder Amy Iezzoni. She and MSU plant pathologist Ray Hammerschmidt have been studying *Armillaria* infections in tart cherry for several years in collaboration with the peach team at Clemson University. They have had some promising breakthroughs. Thanks in part to the MTFC, the Hollender Lab is now able to help provide genetic solutions for *Armillaria* for the Michigan cherry industry.

Commission makes a difference in educator's early career

By Dave Jones,
West Central Michigan Tree Fruit Educator

The Michigan Tree Fruit Commission (MTFC) has made a major difference especially in these early years of my career with Michigan State University (MSU) Extension. When the drive to fill my position in west central Michigan fell short, the MTFC stepped up and provided funds for the search and screening process, as well as for a portion of my salary. Without their support and hard work, I would not be happily working in west central Michigan. This fact alone makes it worth taking the time to be thankful. However, the MTFC didn't just help to get me here; they also made sure that I had the tools to help the tree fruit growers to the best of my abilities.

When I first arrived at my office in Hart, there were no facilities for lab work or field sample processing. This posed a huge difficulty to me as a young professional and a scientist. Growers in the region had been waiting for years for local apple maturity work, spotted wing drosophila (SWD) monitoring and fruit testing, and pathology work with diseases such as fire blight. Unfortunately, I had no ability to meet these needs due to lack of equipment and space. Additionally, opportunities to collaborate with great campus faculty to help growers were present, but without supplies I had no chance of making it happen. Rather than leaving me without the proper facilities to help the growers and collaborate with campus on research projects, the MTFC stepped up and made our vision a reality.

The West Central Tree Fruit Extension Lab was funded through the MTFC mini-grant program. We've accomplished all of the projects asked of us this season. We now have new microscopes, a bacterial incubator, agristrip tests for rapid fire blight diagnosis, ample lab bench space, a laminar flow hood,

I spent the night watching the frost fan battle against the freezing temperatures with one of my region's growers.



Microscopes and microbiology supplies in the West Central Tree Fruit Extension Lab were funded by the MTFC.

a benchtop autoclave, testing equipment for apple maturity work and adequate supplies for SWD work. We use these supplies constantly during the growing season to help growers do one of the hardest jobs in the world a little more efficiently.

In addition to providing equipment, the MTFC contributed a portion of the funds that brought a research technician to the region for the summer. Sarah Springer worked with me as our technician all season long, helping to ensure our projects went smoothly. The extra set of hands was invaluable. Thanks to the extra help with field data collection, I continued to visit growers with concerns about their crops within one to two days of contact. I remained visible and active on farms throughout the region, expanding the region's connection to MSU Extension's resources.

As a result, we delivered weekly newsletters, text list alerts, articles and other important informational resources to the farming community smoothly and on time. I was also able to continue to offer programming during the busy field season, including a field-scout training day, a workshop on managing fruit in a low-crop season, talks and tours at the Extension lab and a fall class through West Shore Community College showcasing Michigan apples. It would not have been possible to accomplish all of this without the help of a technician this season.

Thanks to the equipment and personnel funds donated by the MTFC this past season, we have been able to work on:

- Collection, identification and isolation of fire blight and screening for resistance to streptomycin
- Monitoring of primary apple scab for area apple growers
- Region-wide trapping and identification of SWD in tart cherry orchards
- Region-wide fruit testing for SWD larvae contamination of tart cherries, nectarines and plums
- A collaborative project examining SWD susceptibility of processing peach



Apple maturity work at the West Central Tree Fruit Extension Lab is made possible by the MTFC.

- Efficacy of the plant growth regulator product Promalin on fruit set, size, color, russet and shelf life following the May frost events, and testing its impact on fresh market and processing apple cultivars

Regional apple maturity testing for commercial apple growers

Identification of insect damage grade-outs in processing peaches at Peterson Farms Inc.

While the funds for some of the work were from other grant sources, the equipment and personnel help from the MTFC made using those funds possible.

The MTFC demonstrates that growers in Michigan want to be in the driver's seat in determining the direction that Extension and research travel as we look to the future. This is the attitude that makes an industry great over time. This is also the kind of community that makes young professionals flock to an industry and stay long-term to do our part. I look to the growers for the ideas that I try to turn into research and Extension programming, and I know that they will continue to help me with both their expertise and their support of the infrastructure to make these ideas a reality. Michigan tree fruit growers don't just participate in the development of the future of their industry – they drive it. I can't wait to see what the next years in my career with the fruit industry bring. Thanks to the MTFC, I know that we are headed in the right direction.

Fire blight samples from west central Michigan: These bacteria were identified using Bioreba Agristrips purchased and screened for streptomycin resistance thanks to help with supplies from MTFC.



Exchanging cherry information in Japan

Michigan State University (MSU) Extension specialist Nikki Rothwell and MSU Extension educator Emily Pochubay received professional development funds from the Michigan Tree Fruit Commission (MTFC) to attend and present spotted wing drosophila research at the Eighth International Cherry Symposium hosted by the International Society for Horticultural Science in Yamagata, Japan, June 5–9, 2017.

Yamagata prefecture is roughly located at the 38th parallel at 2,625 feet above sea level on the main island of Japan, northwest of Tokyo. This region has a sizeable agricultural base

Nikki Rothwell



and produces a variety of crops including rice, vegetables, edamame (soybeans eaten fresh), grapes and several tree fruits including 29.1 million pounds of the country's 40 million total pounds of sweet cherries.

Like Traverse City, Yamagata is famous for cherries, and this area is the primary cherry production region of Japan. Much like Michigan's focus on Montmorency tart cherry production, Yamagata's cherry production – about 70 percent of it – is comprised of the sweet cherry variety Satonishiki, the prized cherry of Japan. Its red skin, white flesh and delicately sweet taste are the key qualities that Japanese consumers desire.

Japan's small-scale cherry orchards are considerably different from Michigan fruit farms. First, the average Japanese cherry farm size is roughly three-quarters of an acre. Most of these small orchards are comprised of trees grown on standard rootstocks under plastic high tunnels. Japan's rainy season overlaps with harvest, and high tunnels help protect ripening cherries from cracking.

Japanese cherry production is also labor intensive, and many orchard tasks including fruit thinning, pollination tactics, leaf pulling and harvest are performed by hand. A one-person operated packing line is used to sort



Satonishiki cherries of Japan.

fruit by weight, and the fruit are packaged into small plastic containers that are sold at a premium price at farm stands and local markets; just over a half-pound of high-quality Satonishiki can sell for \$52 (U.S. value). Cherries are also shipped and sold to markets and customers throughout Japan.

Rothwell and Pochubay were pleased with this rare opportunity to visit with international researchers and cherry producers. They extend thanks to the Michigan State Horticultural Society and the MTFC for the opportunity to attend this meeting.

MTFC sponsors Enviro-weather projects, modernizes sites

Economical, sustainable and successful tree fruit production in Michigan typically requires large amounts of detailed weather-related information for integrated pest management (IPM), irrigation, frost protection and other management-related decisions. The Michigan State University Enviro-weather Project provides such information in support of Michigan's agricultural sector. Since the inception of Enviro-weather, the fruit industry has been a major user and has played a significant role in the program's growth and development.

The Michigan Tree Fruit Commission (MTFC) has provided support in both advisory and financial forms to assist the operation, growth and development of Enviro-weather. In particular, the MTFC has sponsored three separate projects through the Michigan Department of Agriculture and Rural Development's Specialty Crop Block Grant Program from 2015 through 2017. Major objectives of these projects include:

- Modernization of 16 of the oldest weather stations in the network.

- Development of new weather-monitoring capabilities for the Enviro-weather system to support IPM activities at two sites in west central lower Michigan.
- Research to improve and refine an existing cherry leaf spot disease model.
- Initial development of a new bacterial spot disease model for peaches.
- Location and date-dependent plant disease "climatologies" for determining overall disease risk.
- Development and deployment of new mobile-ready products for several key fruit pest applications in Michigan.
- Development of real-time inversion monitoring capability by installation of new, instrumented, weather observation tower(s) in key fruit-producing areas of the state and subsequent development of low-level inversion monitoring and forecasting capabilities to support frost control activities.

Budgetary support for Enviro-weather's weather-monitoring network includes the

costs for basic maintenance and service, but does not provide funds for long-term, systematic replacement of weather stations or related components. Portions of the network, especially those located in fruit production areas, were in serious need of modernization due to age and long-term continuous use.

In 2015, Enviro-weather modernized 16 network station sites in production areas of the state representing more than 75 percent of Michigan's fruit-producing acreage. Funds obtained by the MTFC allowed Enviro-weather to purchase the components necessary for modernization. Replacement supplies at each site included a new datalogger, datalogger enclosure, solar panel, sensors for air temperature, relative humidity, rainfall, wind speed and direction, solar radiation, soil temperatures and volumetric soil moisture (both at two depths), two leaf wetness grids, and wireless cell modem and directional antenna for operational communications.

Southwest Michigan Research and Extension Center

The Southwest Michigan Research and Extension Center (SWMREC) has been greatly helped by the financial support of the Michigan Tree Fruit Commission (MTFC). Examples include:

- A woven-wire deer fence to protect 24 acres of tree research plantings. The fence is critical for protecting newly planted trees and experiments plots where precise measurements of yields are needed. There has been no tree damage by deer in the area since the fence was installed. New tree fruit research projects are now feasible with secure deer management.
- An orchard spray and tractor to replace old equipment. The new equipment has electronic valves so that the operator can adjust to different plot types. The tractor is suited for higher density tree fruit research.
- A platform for work on high-density tree fruit. The platform was used extensively for apple and peach research plot work (for example, trellis construction, pruning, tree training, pheromone tie placement and harvesting) during 2017. It will be an important part of new tree wall research

The new tractor and sprayer jointly purchased by MTFC and MSU.



projects. The platform has also been useful for installing and repairing plastic coverings on high tunnels.

- Renovation of two office rooms into laboratory spaces for fruit tree disease and insect research. The restored facilities are used to study bacterial spot disease of stone fruit and research on spotted wing drosophila (SWD) and fruit fly maggots. MTFC grants also funded field studies in 2016 and 2017 to determine the impact of SWD on Michigan peach, nectarine and plum commercial plantings. *(Michigan Department of Agriculture and Rural Development also contributed funding to this.)*
- Three tree fruit research plantings (two at SWMREC and one on campus) in 2017 to study chemical and cultural methods to manage bacterial diseases of stone fruit. These new plantings will be used over many years to test new experimental chemicals and timing strategies to find better ways to reduce fruit and tree damage by these diseases in commercial orchards. *(Michigan Department of Agriculture and Rural Development also contributed funding to this.)*
- Support for the propagation and testing of advanced elite peach selections that show promise for the Michigan peach industry. *(Michigan Peach Sponsors also contributed funding to this.)*
- Support for Michigan State University (MSU) Extension educator Bill Shane to attend the International Fruit Tree Association winter meetings in February 2017, in Wenatchee, Washington. These meetings helped Shane gain valuable knowledge and experience that he will use to help the Michigan tree fruit industries.



SWMREC personnel uses a platform on one of many projects, in this case, to do cross-pollination of peaches to make new peach varieties.



Bill Shane attended this field tour at the International Fruit Tree Association winter meetings February 2017 in Wenatchee, Washington.

Trevor Nichols Research Center

The Michigan State University Trevor Nichols Research Center (TNRC) develops effective integrated pest management (IPM) strategies for Michigan's fruit industry and serves as an information hub for IPM.

The TNRC has approximately 80 planted acres of fruit crops, including apples, cherries, peaches, pears, blueberries, caneberries and grapes. It is strategically positioned to host a diversified stream of research projects to support scholarly advances in science and provide real-world solutions for tree fruit IPM practices.

The Michigan Tree Fruit Commission has provided funding for several upgrades at the TNRC:

- Extensive land preparation (including orchard removal and tiling)
- Orchard establishment in 2017
- New tree plantings including three acres of apples, one acre of plums and two acres of tart cherries



Finished addition.

- Renovations of the TNRC dormitory, which houses 10 to 15 graduate students each field season
- Improvements to carpet, furnishings and entrance doors; painting of walls and building of a back porch

Additionally, the pesticide mixing room within the pesticide storage facility will be updated by the beginning of the 2018 field season. TNRC staff prepare over 600 maintenance and research sprays per year for a wide range of research, including insecticide efficacy trials, pheromone research, rainfall simulation studies and field residue trials.

MSU Tree Fruit Pathology Research Farm

A new four-tank handgun sprayer was built by Gillison's Variety Fabrication with funding from the Michigan Tree Fruit Commission (MTFC) to replace a 30-year-old sprayer prone to frequent breakdowns. The new sprayer has a Honda motor, which powers the pump and mechanical agitation; an auxiliary fresh water tank for flushing tanks and lines after applications; an electric hose reel and rear facing lights for night applications.

The sprayer is used in the apple scab, fire blight, brown rot and cherry leaf spot trials conducted at the Michigan State University Plant Pathology Research Farm in East Lansing. The four tanks allow for the application of individual trial compounds to single tree plots in the research orchards. Treatments are replicated four times and applied to runoff at 300 gallons per acre. These efficacy trials allow the research team to evaluate new products that the plant protection companies and research institutions are developing for future use in Michigan tree fruit production.

The MTFC also funded a belt-mounted powered air-purifying respirator, which provides full protection from the trial materials when spraying around the trees. This system comes equipped with an organic vapor filter, which purifies outside air and returns it through vents in the face mask. This major upgrade allows for safe operation in high temperatures and for the lengthy time to apply treatments.



Cory Outwater, field technician for George Sundin, professor in the Michigan State University Department of Plant, Soil and Microbial Sciences.

Northwest Michigan Horticulture Research Center

The Northwest Michigan Horticulture Research Center purchased 37 acres of land adjacent to its current property in Leelanau County in June 2017.

Michigan State University (MSU) researchers and Northwest Michigan Horticulture Research Foundation board members concluded that more acreage of production-aged cherry trees was needed at the center to conduct critical research on the invasive insect

spotted wing drosophila (SWD). The acreage was purchased in partnership with MSU and a Michigan Department of Agriculture and Rural Development grant. The Michigan Tree Fruit Commission has committed to provide the infrastructure for this new property, including road upgrades, irrigation, new trees and a deer fence.

This land and tree purchase as a long-term investment into tree fruit research for

the region and for Michigan's tree fruit industries. The acreage provides the opportunity to expand research capabilities across many disciplines, but particularly with critical and timely research when needed to combat emergent issues such as SWD. The additional research capabilities will enable Michigan growers to stay on the cutting edge of fruit production and to maintain the industry's global competitiveness.

Clarksville Research Center

In 2017, the Michigan Tree Fruit Commission provided substantial funding for a deer fence at Michigan State University's Clarksville Research Center.

Research at this 440-acre station includes tart cherry breeding, apple and sweet cherry variety and rootstock evaluation, high-efficiency orchard systems, fruit thinning and growth regulator development, and integrated pest management testing to improve profitable and sustainable fruit production for Michigan.

The deer fence was a major infrastructural need, as new orchards often suffered significant damage due to deer predation. With the installation of the 8-foot-high, roughly 3.77-mile-long fence, all tree fruit research trials, including a new high-density apple orchard planted in 2017, are protected from deer grazing.



Deer fence installation completion.