

Proceedings of the
98th Annual
**Cumberland-Shenandoah
Fruit Workers Conference**



December 1st & 2nd, 2022
Holiday Inn Winchester SE-Historic Gateway,
Winchester, Virginia

(FOR ADMINISTRATIVE USE ONLY)

**Proceedings of the
Cumberland-Shenandoah
Fruit Workers Conference
98th Annual Meeting**

December 1st & 2nd, 2022

Holiday Inn Winchester SE-Historic Gateway,
Winchester, Virginia

Edited by
Daniel J. Donahue

Cornell University
Cornell Cooperative Extension
Eastern New York Commercial Horticulture Program

Special Thanks to Sarah Elone and Kaitlyn McNamee, CCE-ENYCHP

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Current and Past Executive Officers

2023

President: Mengjun Hu (Maryland)
Secretary/Treasurer: Srdjan Acimovic (Virginia Tech)
President-Elect: Steven Bogash (Pro Farm Group)
Immediate-Past President: Daniel J. Donahue (Cornell)

2022

President: Daniel J. Donahue (Cornell)
Secretary/Treasurer: Srdjan Acimovic (Virginia Tech)
President-Elect: Mengjun Hu (Maryland)
Immediate-Past President: Tom Kon (NC State)

2021

President: Tom Kon (NC State)
Secretary/Treasurer: Srdjan Acimovic (Virginia Tech)
President-Elect: Daniel J. Donahue (Cornell)
Immediate-Past President: Dean Polk (Rutgers)

2020

President: Dean Polk (Rutgers)
Secretary/Treasurer: Chris Bergh (Virginia Tech)
President-Elect: Tom Kon (NC State)
Immediate-Past President: Kerik Cox (Cornell)

2019

President: Kerik Cox (Cornell)
Secretary/Treasurer: Chris Bergh (Virginia Tech)
President-Elect: Dean Polk (Rutgers)
Immediate-Past President: Mike Dimock (Certis USA)

2018

President: Mike Dimock (Certis USA)
Secretary/Treasurer: Chris Bergh (Virginia Tech)
President-Elect: Kerik Cox (Cornell)
Immediate-Past President: Greg Krawczyk (Penn State)

2022 CSWFC Participants

Name	Organization
Aaron Weber	NC State University
Alyssa Kloos	USDA - Appalachian Fruit Research Station
Amelia Heintz-Botz	NC State University
Amolpreet Kaur Saini	Virginia Tech, AHS Jr AREC
Andrew Bierer	USDA-AFRS
Ann Rucker	Rutgers-Bridgeton
Annie Vogel	NC State University
Beth Sastre	VCE Louodun
Bill Mackintosh	Private consultant, Fruit Grower, and Nutrien Representative
Blaise Jumbam	University of Maryland
Brent Short	Trece, Inc.
Breyn Evans	USDA-ARS AFRS
Byron Phillips	Wilbur-Ellis Company
Caitlin Barnes	USDA - Appalachian Fruit Research Station
Carrie Mansue	Rutgers
Chelsea Abegg	Rutgers Honey Bee IPM
Chester Allen	Crown Orchard
Chris Bergh	Virginia Tech
Christopher Clavet	NC State University
Daniel Beatty	Nutrien Ag Solutions
Daniel Donahue	Cornell University, CCE ENYCHP
Dave Schmitt	Rutgers Cooperative Extension
David Biddinger	Penn State University Fruit Research and Extension Center
David Rosenberger	Cornell University
Doug P Pfeiffer	Virginia Tech
Elena Gomez	Penn State University
Erin Hitchner	Syngenta
Felix Cervantes	Bayer Crop Sciences
Greg Krawczyk	Penn State Fruit Research and Extension Center
Greg Reighard	Clemson University
Gregory Clarke	VALENT USA
Henry Chiles	Crown Orchard
Holly Bartholomew	USDA- ARS, Food Quality Laboratory
Holly Shugart	Penn State University
Jake Jones	FMC
James Steffel	LABServices
Janet van Zoeren	Cornell Cooperative Extension - Lake Ontario Fruit
Jason Bielski	Virginia Tech
Jensen Hayter	NC State University
Jesus Diaz	Virginia Employment Commission
Jim Hepler	USDA - Appalachian Fruit Research Station
Jim Schupp	Penn State Fruit Research and Extension Center
Jimmy Larson	NC State University

Name	Organization
Johanna Elsensohn	USDA - Appalachian Fruit Research Station
John Bennett	USDA-ARS AFRS
John O'Barr	BASF Corporation
John Rasch	Wilbur-Ellis
Joseph Wirts	USDA - Appalachian Fruit Research Station
Joshua Gery	Penn State Fruit Research and Extension Center
Julie Urban	Penn State University
Kaitlyn McNamee	Cornell University, CCE ENYCHP
Kara Schut	Wilbur-Ellis
Kathleen Leahy	Polaris Orchard Management IPM
Keagan Handley	A.C.D.S. Research, Inc.
Keith Yoder	Virginia Tech, AHS Jr AREC
Kenner Love	Virginia Cooperative Extension-Rappahannock Unit
Kenny Savia	Virginia Tech AREC
Kevin Rice	Virginia Tech, AHS Jr AREC
Khalil Jahed	Virginia Tech, AHS Jr AREC
Larissa Smith	Syngenta
Laura Mellott	Penn State Fruit Research and Extension Center
Lee Carper	USDA - Appalachian Fruit Research Station
Linda Davis	Wilbur Ellis
Lisa Tang	USDA
Mahfuz Rahman	West Virginia University
Mark Shannon	Shannon Farm Services, Inc.
Mark Sutphin	Virginia Cooperative Extension
Mengjun Hu	University of Maryland
Mizuho Nita	Virginia Tech
Nathan Brandt	Virginia Tech, AHS Jr AREC
Norman Lalancette	Rutgers
Pete Nelson	HortSystem
Phillip Martin	LABServices
Pierce Lynch	NC State University
Pragya Chalise	Virginia Tech
Ricardo Ortiz	Virginia Employment Commission
Robert Oakes	CBC America
Robert Pollock	Penn State Extension
Sam Patel	Rutgers
Sarah Henderson	Penn State Fruit Research and Extension Center
Scott Cosseboom	University of Maryland
Sean Gresham	NCSU
Shannon Rotella	University of Maryland
Sherif Sherif	Virginia Tech
Sieger Bokschooten	Telamon Pesticide and Workplace Safety Trainer
Srdjan Acimovic	Virginia Tech, AHS Jr AREC
Steve Bogash	Pro Farm Group formerly Marrone Bio Innovations
Steve Schoof	NC State University
Sudeep Mathew	Syngenta
Tami Collum	USDA-ARS AFRS

Name	Organization
Taylor Lucas	USDA - Appalachian Fruit Research Station
Timothy Johnson	Pro Farm Group Inc.
Tom Kon	NC State University
Torri Hancock	USDA - Appalachian Fruit Research Station
Tracy Leskey	USDA - Appalachian Fruit Research Station
Valen Straub	LABServices
Verneta Gaskins	USDA- ARS, Food Quality Laboratory

Sponsors:

LABServices

FMC

CBC (America) Corp.

Syngenta

Valent

98th Cumberland-Shenandoah Fruit Workers Conference

December 1st & 2nd, 2022

Holiday Inn Winchester SE-Historic Gateway, Winchester, Virginia

CONFERENCE AGENDA

All times listed are EST

Thursday, December 1:

- | | |
|---------------|---|
| 8:00 – 9:00 | Registration |
| 9:00 – 9:10 | Call to Order |
| 9:10 – 10:10 | Call of the States |
| 10:10 – 10:30 | Call of the Industry |
| 10:30 – 10:45 | BREAK |
| 10:45 – 12:00 | Plenary Session
“Discussing the current direction of federal agricultural policy, research funding, and pesticide registration issues”
Ms. Diane Kurrle , Senior Vice-President of the United States Apple Association, and Dr. Clayton Myers , Entomologist with the USDA Office of Pesticide Management Policy
Audience Q & A |
| 12:15 – 1:00 | LUNCH |
| 1:15 | Concurrent Sessions
Entomology
Horticulture
Plant Pathology |
| 5:30 | MIXER |
| 6:30 | Dinner on your own |

Friday, December 2nd:

- | | |
|-------------|--|
| 8:00 – 9:00 | CSFWC Business Meeting (all are invited) |
|-------------|--|

Entomology Concurrent Session Agenda

- 1:15 – 1:30 **Persistence pays off: Five years of tracking *Trissolcus japonicus* following releases in Virginia**
Chris Bergh (Alson H. Smith Jr. Ag. Res. and Ext. Ctr., Virginia Tech, Winchester, VA), Elijah Talamas (Division of Plant Industry, Florida Dept. of Ag. and Consumer Serv.), Nate Brandt (Virginia Tech AHSAREC), Ashley Edwards, and Cynthia MacRae (Virginia Cooperative Ext.)
- 1:30–1:45 **Early and late season wild hosts of the brown marmorated stink bug, *Halyomorpha halys***
James Hepler (USDA–ARS Appalachian Fruit Research Station), Whitney Hadden (Syngenta), and Tracy Leskey (USDA–ARS Appalachian Fruit Research Station)
- 1:45–2:00 **Management of *Halyomorpha halys* in Mixed–Cultivar Apple Orchards**
Stephen Schoof and James Walgenbach (North Carolina State University)
- 2:00–2:15 **Brood X Periodical Cicada Feeding Activity Measured By Molecular Gut Content Results**
Tracy Leskey (USDA–ARS Appalachian Fruit Research Station), James Hepler, Liam Dardick, Laura Nixon (USDA–ARS Appalachian Fruit Research Station), and Michael Raupp (University of Maryland)
- 2:15–2:30 **Tracking and controlling ambrosia beetles through space and time**
Jensen Hayter, Stephen Schoof, and James Walgenbach (North Carolina State University)
- 2:30–2:45 **Using drone technology to investigate insect movement in orchards**
Johanna Elsensohn, Scott Wolford, Amy Tabb, and Tracy Leskey (USDA–ARS Appalachian Fruit Research Station)
- 2:45–3:00 **Surveillance of populations of ants and mealybugs in vineyards in Virginia**
Pragya Chalise and Douglas Pfeiffer (Virginia Tech)
- 3:00–3:30 **Group Discussion & Break**
- 3:30–3:45 **Survival and development of nymphal spotted lanternfly, *Lycorma delicatula*, on a variety of fruit and vegetable crops**
Holly Shugart, Elena Gomez, and Julie Urban (Pennsylvania State University)
- 3:45–4:00 **Management of hatching spotted lanternfly (*Lycorma delicatula*) with overwintering applications of *Beauveria bassiana***
Jason Bielski, Douglas Pfeiffer, and Stefan Jaronski (Virginia Tech)
- 4:00–4:15 **Evaluating Entomopathogenic Nematodes for Management of the Invasive Spotted Lanternfly, *Lycorma delicatula***
Laura Nixon, Caitlin Barnes, Taylor Lucas (USDA–ARS Appalachian Fruit Research Station), Stacy Byrd (USDA–ARS Southeastern Fruit and Tree Nut Research Laboratory), Alyssa Kloos (USDA–ARS Appalachian Fruit Research Station), David Shapiro–Ilan (USDA–ARS Southeastern Fruit and Tree Nut Research Laboratory), and Tracy Leskey; (USDA–ARS Appalachian Fruit Research Station)

- 4:15–4:30 **Pre–Bloom Systemic Pesticides Can Contaminate Solitary Bee Pollen Food Stores and Affect Larval Development and Increase Pupal Mortality**
Pearl Phan (University of Arkansas), David Biddinger (Penn State University Fruit Research & Extension Center), Neelendra Joshi (University of Arkansas), Kari Peter (Penn State University Fruit Research & Extension Center), and Ed Rajotte (Penn State University Entomology)
- 4:30–4:45 **Honey bee, what’s in your pollen? Residuals and pollen diversity in relation to colony health**
Chelsea Abegg (Rutgers University Honey Bee IPM Extension), Dean Polk (Rutgers University Fruit IPM), and Cesar Rodriguez–Saona (Rutgers University Extension)
- 4:45–5:00 **A New Plant Bug and Increasing Plum Curculio Damage in Pennsylvania Apple Orchards**
David Biddinger (Penn State Fruit Research & Extension Center)
- 5:00–5:15 **Bountify, a New Insecticide for Management of Multiple Pests of Tree Fruit**
Timothy Johnson, Brian Mueller, Steven Bogash, and Maryna Serdani (Pro Farm Group)

Plant Pathology Concurrent Session Agenda

- 1:15–1:30 **Management of pear shoot blight and fire blight cankers with preventive applications of Regalia**
Srdan G. Acimović, Matheus Borba, Bidhan Dhar (Virginia Tech), and Christopher Meredith (Cornell University)
- 1:30–1:45 **Summary of Peach Disease Control using Biorational Materials: Year 2**
Norman Lalancette and Lorna Blaus (Rutgers University)
- 1:45–2:00 **A Microbial Enigma: investigating non–pathogenic *Penicillium* spp. in apple fruit for fundamental and translative applications**
Holly Bartholomew (ORISE Postdoctoral Researcher at USDA), Bret Cooper, Verneta Gaskins, Jorge Fonseca, and Wayne Jurick II (USDA–ARS)
- 2:00–2:15 **Comparative analysis of culturable microbiomes to determine the causal agent(s) of grape sour rot**
Blaise Jumbam and Mengjun Hu (University of Maryland)
- 2:15–2:30 **Fungicide sensitivity and species associated with *Aspergillus* fruit rot of wine grape in Maryland**
Scott Cosseboom and Mengjun Hu (University of Maryland)
- 2:30–2:45 **Detection and quantification of live *Erwinia amylovora* cells in fire blight cankers with viability droplet digital PCR**
Srdan G. Acimović, Bidhan Dhar (Virginia Tech), and Ricardo Delgado Santander (Washington State University)
- 2:45–3:00 ***Colletotrichum* species causing apple bitter rot in Virginia, apple cultivar susceptibility, and fungicide options**

Srđan G. Aćimović, Fatemeh Khodadadi, Diana McHenry (Virginia Tech), and Ricardo Delgado Santander (Washington State University)

- 3:00–3:30 **Group Discussion & Break**
- 3:30–3:45 **Fungal competition between apple wood endophytes and ambrosia beetle nutritional symbionts**
Sean Gresham, Sara Villani, and James Walgenbach (North Carolina State University)
- 3:45–4:00 **Reducing Synthetic Fungicides in Grapes with Biofungicides**
Steve Bogash (ProFarm Group)
- 4:00–4:15 **Management of Bitter Pit and Bitter Rot of Apple**
Mahfuz Rahman and Whitney Dudding (West Virginia University)
- 4:15–5:00 **Group Discussion & Question/Answer**

Horticulture Concurrent Session Agenda

- 1:15–1:30 **Evaluation of semi-dwarfing peach rootstocks for intensive orchard systems in South Carolina**
Gregory Reighard and David Ouellette (Clemson University)
- 1:30–1:45 **Effect of ACC for thinning peach: timing, split applications, and spray volume**
Jim Schupp, Melanie Schupp, and Long He (Penn State Fruit Research and Extension Center)
- 1:45–2:00 **2022 Accede Peach Thinning Trial in the Hudson Valley of New York State**
Daniel Donahue and Kaitlyn McNamee (Cornell Cooperative Extension, ENYCHP)
- 2:00–2:15 **Effects of tree architecture on canopy light environments and fruit quality in plum**
Lisa Tang (USDA–ARS Appalachian Fruit Research Station), Macarena Farcuh (University of Maryland College Park, Department of Plant Science and Landscape Architecture), and Chris Dardick (USDA–ARS Appalachian Fruit Research Station)
- 2:15–2:30 **Fruitlet chlorophyll content dictates prediction of fruitlet abscission following a chemical thinner application**
Jimmy Larson, Penelope Perkins–Veazie, and Thomas Kon (NCSU)
- 2:30–2:45 **Informing apple hand–thinning with computer vision**
Thomas Kon, Jimmy Larson, Annie Vogel, and Chris Clavet (NCSU)
- 2:45–3:00 **New Jersey Blueberry Weed IPM Update**
Carrie Mansue and Thierry Besancon (Rutgers University)
- 3:00–3:30 **Group Discussion & Break**
- 3:30–3:45 **Prohexadione calcium: an effective vegetative growth retardant and fire blight control agent**
Annie Vogel and Thomas Kon (North Carolina State University)

- 3:45–4:00 **Pre-emergent Herbicide Timing: Efficacy and Tree Health Impacts**
Janet van Zoeren (Cornell Cooperative Extension, Lake Ontario Fruit) and Michael Basedow (Cornell Cooperative Extension, Eastern New York Horticulture Program)
- 4:00–4:15 **NAA Application Rates and Timings to Increase Return Bloom in 'Honeycrisp' Apples**
Sherif Sherif (Alson H. Smith Jr. Agricultural Research and Extension Center, School of Plant and Environmental Sciences, Virginia Tech)
- 4:15–4:30 **Rootstock's influence on frost tolerance in apple trees is linked to shifts in soluble sugar levels in the scion's leaves and blossoms**
Amolpreet Kaur Saini, Sherif Sherif, Tabibul Islam and Jianyang Liu (Virginia Tech)
- 4:30–4:45 **Validation of 'Honeycrisp' Bitter Pit Prediction in New York State**
Daniel Donahue and Kaitlyn McNamee (Cornell Cooperative Extension, ENYCHP)
- 4:45–5:00 **Group Discussion & Question/Answer**

BUSINESS MEETING MINUTES

December 2nd, 2022

Compiled and submitted by Srdjan Acimovic, CSFWC Inc. Secretary/Treasurer

Daniel Donahue called the meeting to order at 9 AM for the Business Meeting of the 98th Cumberland-Shenandoah Fruit Workers Conference held on 12/2/2022, 9 AM.

Administration:

Dan Donahue, current President of the CSFWC Inc. confirms that that quorum of more than 10% of the membership has been fulfilled as per bylaws (~100 – 120 members). The approval of the minutes from 2021 CSFW Inc. Business Meeting shared with the membership via e-mail were put to motion for by Sara Villani. Kaitlyn McNamee seconds. Voting was conducted and all members voted in favor. There was no discussion of the minutes. Attendance report for the meeting by Secretary Treasurer stated 98 registered for the current CSFWC meeting, which was close to 110 registrants for the last meeting in 2019 help in person, which was a good turnout for first meeting in person after pandemic. Christopher Bergh requested if it can be confirmed that the list of paid registrations was used for this report, which was confirmed by S. Acimovic. Kaitlyn McNamee confirmed that number of picked up name tags was like the number of reported registrants, with some forgetting to get their name tags. The number of presentations submitted for the Program for 2022 had somewhat lower number of 34 in comparison to the 54 presentations that were submitted in 2019. Donahue stated this could be due to Covid-19 shutdown of the Universities impacting the lower productivity of the members, leading to lower number of submitted presentations. David Rosenberger voiced the opinion that wave of new faculty and extension positions after retirements at the Universities include duties in multiple crops (e.g. vegetable, ornamentals, fruits) making the specialists not able to attend single commodity meetings i.e. keep up with too many meetings for multiple commodities.

In connection with the number of presentations discussions were made about the suggestion to hold the future CSFWC Inc business meetings on the first day of the meeting, from 8-9 AM, not the second day. Such a change was not discussed by the Executive Committee of CSFWC and should not need to be considered for motion and voting on this business meeting, but that this can be a decision made ad hoc next year by the next year's President. Douglas Pfeiffer stated that next year's meeting when new number of presentations is revealed would be better time to decide on this issue. Christopher Bergh stated that in discussions during the meeting the low turnout might be due to meeting fatigue stemming from both conferences, grant agency reporting sessions, and grant planning meetings. Donahue stated that the state commodity group funding agencies like Apple Research Development Program in New York State have moved their

proposal submission deadlines to historically the earliest date so far (change from Feb 3 years ago to, January 2021, to Dec 2022). These deadlines prevented some people to attend 98th CSFWC Meeting.

The Secretary Treasurer's report was presented by Srdjan Acimovic. Both the 2020 and 2021 fiscal years reports were presented, as an incomplete report for FY2020 was presented at the Business Meeting in 2021 CSFWC Meeting due to obstacles stated in the previous minutes. A balance of \$27,126.33 at the Truist Bank and PayPal account balance of \$4,517.26 were held at the end of the FY2020. Total balance reported was \$31,643.59. In 2020 the meeting was virtual and no costs for venue were paid and deposit of \$1,000 from previous meeting carried over to the future meeting in 2021. In FY2021 we had a record attendance of 120 members. The 2021, the meeting was also held virtual, via video conference call, carrying over the venue deposit balance to the 2022 Meeting. Balances after all costs were \$4,347.20 in PayPal, \$26,901.33 in Truist Bank leading to a total balance of \$35,989.90. In 2022 we had a 98 members attendance. Sara Villani asked what the attorney fees for filing taxes as an annual post-card and these were elaborated to the attendees of the Business Meeting. Daniel Donahue anticipates an increase in the attorney fee costs due to inflation. Rosenberger asked why the cost per attendee went to less than half what it used to be and the Proceedings printing has been discussed in switching to an online Proceedings. Both FY 2020 and 2021 Secretary-Treasurer reports were put in motion for a vote and all voted in favor of the report with no opposed.

Old Business:

Recognition of the 100th CSFWC Meeting Anniversary in Dec 2024. Floor is open for discussion. Srdjan Acimovic asked for the 1st year the meeting was held. 1925 was stated as the first year the CSFWC meeting was held. It was stated that the Executive Board of the CSFWC at that time to determine what special event will be organized for the Anniversary (e.g. gala dinner, or other celebration event) for this milestone.

Ongoing project on digitization of Proceedings of all previous CSFWC meetings started by Phillip Martin. He provided the update report on the progress in this task. Martin initiated this after Penn State FREC decided to clean their Library and he salvaged old Proceedings from CSFWC. He came up with an idea to digitize them and contacted Penn State's Library's Helen Smith as the Ag Librarian. They supported this initiative and would conduct the digitization to post the PDF-s on their website and we could post the copy on the CSFWC website. The Library has the Digital Deposit License that needs to be signed before anything can proceed. The hard copies of the Proceedings from 1925-2024 excluding the 2020 Meeting would have to be donated to the Library. The agreement states that hard copies become property of the library and is their possession, but they will make them publicly available. Parts of the License were read to

attendees. Changes in the wording would take a lot of time due to Penn State attorney involvement. Both the Secretary/Treasurer and the current President would need to sign this document for the Library to start digitization. One attendee asked would the copies still be accessible to the interested readers by visiting the Library? The Proceedings would be in the Special Collections of the Library where the old references are stored. One could not lend the actual hard copy for use outside of the Library but access would be permitted. The PDF versions would be publicly available at both Penn State's and CSFWC websites. James Schupp described how this process goes in accessing Special Collections materials like photos. Scans and copies are allowed. Pfeiffer stated that PDF-s would be much more accessible to all our membership. Steve Bogash has advised that CSFWC Inc Attorney at least looks at the wording of the License so that nothing is missed, and all eventualities are covered (e.g. to add the clause that if Library did not want the Proceedings that they could go back to the CSFWC organization). Srdjan Acimovic proposed that this continues forward as an initiative, without too many complications, as someone offered their time to digitize these files as other members of the CSFWS have the duplicate copies of all or some Proceedings in their possession (e.g. Keith Yoder). Rosenberger raised the statement in the Proceedings that abstracts are not for publication, so question was if digitization was not violating that statement of "not allowed for publication." Martin clarified that the abstracts have a statement that they are not for citation, instead not for publication. Further discussion went into details and suggestions on using key words from PDF-s to present these at the Anniversary to reveal trends in pest problems or research topics. Donahue suggested to put this decision on a License, with a clause that will satisfy CSFWS Inc needs, be to a vote for membership at the time of preparation for Anniversary Meeting and the then acting President. He asked for a motion to be initiated by the attendees to approve this direction and but allow for the statement to be reviewed and analyzed by an attorney. Votes were all in favor of signing the License document pending attorney approval by the attorney and fees paid to the attorney.

Proposal for a graduate Student Award for the Best Presentation at the CSFWC Meeting. Discussion was opened to the floor. Sherif Sherif initiated this proposal to increase attendance by students. The topics on whether the award should be discipline specific or an all-meeting one was discussed. Rules were discussed, rating sheets, judge/s selection, award sponsoring by industry and the criteria for selection, as well as the issues of concurrent sessions or if the student competition would distract informal discussions and questions typical for and favorite of this meeting. Suggestions were to keep this award as simple as possible and have a minimal number of contestants to keep the competition. A travel award was suggested and points for rating discussed. Kon suggested a proposal to be written and submit it to the Executive Committee and members to read. Martin suggested free registration for students and call it award and not a competition. It should be recognition, not competition. Sherif will use the feedback to draft a

proposal. The survey was suggested to improve an award after a trial one year. Sara put in motion a suggestion for authorizing the Executive Committee of CSFWC to compile and send all members the proposal by the end of March 2023 for feedback period and then a vote during summer 2023. All were in favor, none opposed.

Within old business, a topic was raised by Secretary/Treasurer Acimovic on defining a source to cover the costs for taking plenary speakers out for dinner prior to the 1st day of the meeting. The suggestion was made to use CSFWC funds from the memberships from Truist account. Bergh stated that there is nothing in bylaws preventing this suggestion from occurring but that it should be offered to a vote by CSFWC membership. Compensation was proposed and approved for an Executive Director role in CSFWC, and voted for by Executive Committee. Hence, discussion was opened on how and in which cases costs of dinner allowing interaction with plenary speakers will be covered. Lodging costs for plenary speakers were not covered by the CSFWC Inc. for this or in the previous meetings. If any Executive Committee members are attending a meal event in an official capacity a Policy by CSFWC was proposed by Donahue to be adopted to covering the costs by CSFWC Inc resources but limit the number of attendees to two attendees in an official capacity representing CSFWC at the dinner (cap). Speakers plus two Executive Committee members, or their substitute, not to exceed two official CSFWC Executive Committee members. A motion in favor of the policy was made and adopted at the Business Meeting. A dollar amount was proposed, and the invitation of an industry representative and Executive Director added to the list of official attendees to the dinner. No dollar cap was imposed and motion was made for a vote that no dollar cap is imposed.

New Business

The tree fruit grower attendance policy was discussed, and concerns raised about the number of attendees for a venue or should this attendance be allowed or not. Yoder stated there was no specific policy preventing growers from attending in the past. Rosenberger stated pesticide credits were associated with growers coming to a meeting. Advantages and disadvantages were discussed. Spray schedules for next were discussed in this meeting with growers. No specific conclusions or decisions were made and the consensus was to continue as it was before.

Dates for the CSFWC Meeting in 2023 were discussed. The Business Meeting date was discussed and venue cost for 1 or 2 days of the meeting. Donahue stated these decisions should be made depending on attendance (registration). The Executive Committee should make this decision as per Donahue. Planning for 2 days was a consensus and Nov 30 and Dec 1st 2023 were selected. Rosenberger suggested doing mini-Review presentations in addition to the research presentation. Other conferences were mentioned. Tom Kon mentioned that this type of presentation is not forbidden. Donahue suggested that Conference call for papers (presentations)

we should state research, extension, and review topics. 30 min presentations for review were discussed. Student review talks are welcome. Motion was made to keep the meeting Nov 30 and Dec 1st 2023 and all were in favor during the vote.

Venue (location) was discussed. Some session rooms were crowded like pathology at 2022 meeting. Other venues were discussed and the current option was the best for a long time. Adjustments for room sizes should be made based on the number of the papers. Charlottesville VA venues were raised. Motion was made to stay in the current venue, it was seconded and voted in favor by all attendees.

President Elect selection position was discussed for 2024. Nominations from floor were made for Phillip Martin, Sara Villani, and Steve Bogash, and discussed. Villani and Bogash were nominated for President Elect for 2024. Motion was made to close nominations for President Elect, and all were in favor. Vote was made in favor of Steve Bogash being the President Elect for the CSFWC Meeting in 2024 and it was voted in favor unanimously.

Bergh has commended the President Donahue, Executive Committee members, and the Secretary Treasurer Acimovic for good organization and flawless running of the CSFWC Meeting of 2022. Motion was made to continue Acimovic's role as Secretary Treasurer and all voted in favor.

The motion was made to adjourn the meeting, seconded by Villani, all were in favor.

CSFWC, Inc. Treasurer's Report for 2020

Respectfully submitted on December 1, 2022 by Srdjan Acimovic, Secretary/Treasurer

Income

Registration/memberships (4 comp) (109)	4,360.00
Sponsorships	NA
Interest	NA
	<u>4,360.00</u>

Meeting Expenses (Virtual meeting)

Meeting rooms	NA
Lunch, coffee, soda	NA
Mixer set-up and bartender	NA
Mixer	NA
Gratuities	NA
Advance deposit (2019) (To be applied to 2022 meeting)	1,000.00
	<u>0.0</u>

Other Expenses

Deposit for 2021 meeting (\$1,000 on file since 2019)	NA
Attorney	218.50
VA State Corporation registration	25.00
PayPal	159.74
	<u>403.24</u>

CSFWC, Inc. Treasurer's Report for 2020

Registrations/memberships (109)	4,360.00
Sponsorships	NA
Meeting expenses	NA
Other expenses	403.24
Balance forward	3,956.76

Account balances as of Dec. 31, 2020	
BB&T	\$27,126.33
PayPal	\$4,517.26
	<u>\$31,643.59</u>

CSFWC, Inc. 2020 Meeting Cost Breakdown

Total meeting cost = 0.0

Facility	0.0	()
Food and non-adult beverages	0.0	()
Adult beverages plus all gratuities	0.0	()
Total cost per attendee	0.0	()
Income per attendee	40.00	()

CSFWC, Inc. Treasurer's Report for 2021

Registrations/memberships (121)	4,800.00
Sponsorships	NA
Meeting expenses	NA
Other expenses (Legal fees, SCC reg fee, PayPal)	<u>452.80</u>
Balance forward	4,347.20

Account balances as of Dec. 31, 2021

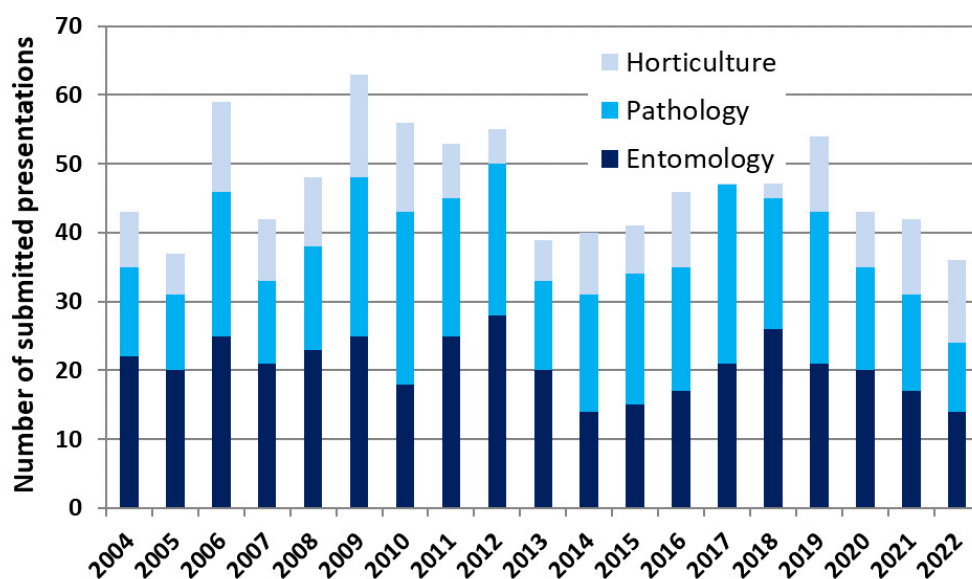
Truist (formerly BB&T)	\$26,901.33
PayPal	<u>\$9,088.57</u>
	\$35,989.90

CSFWC, Inc. 2021 Meeting Cost Breakdown

Total meeting cost = 0.0

Facility	0.0	()
Food and non-adult beverages	0.0	()
Adult beverages plus all gratuities	0.0	()
Total cost per attendee	0.0	()
Income per attendee	40.00	()

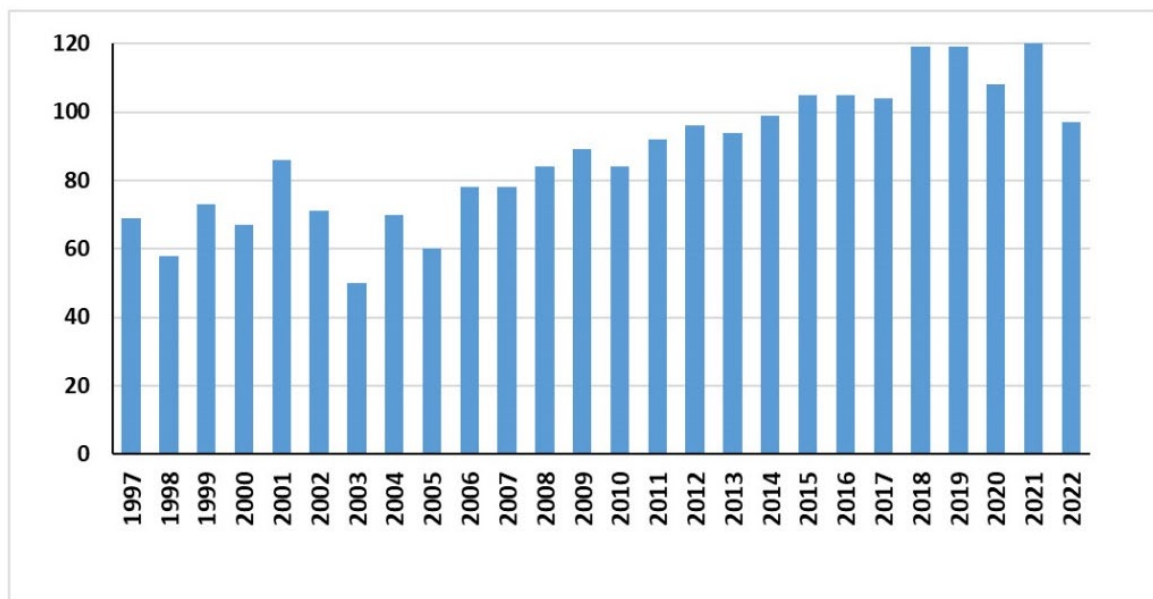
Submitted presentations (2004 – 2022)



CSFWC Costs Per Meeting

Year	Total Cost	Cost/attendee
1998	1,624.40	28.00
1999	1,916.78	26.25
2000	2,134.64	31.86
2001	2,453.93	28.53
2002	2,055.61	28.95
2003	1,876.73	26.80
2004	2,297.78	32.83
2005	2,356.91	39.28
2006	3,636.68	46.62
2007	5,063.82	64.92
2008	6,093.40	72.54
2009	6,052.39	67.25
2010	6,573.02	78.25
2011	6,769.27	73.57
2012	7,581.78	71.97
2013	6,765.92	71.98
2014	7,520.00	82.44
2015	7,172.99	65.16
2016	5,791.70	56.16
2017	6,157.97	59.21
2018	6,137.87	43.17
2019	6,141.11	43.20
2020	covid 0.0	0.0
2021	covid 0.0	0.0
2022		

Attendance records (1997 – 2022)



CALL OF THE STATES

2022 TREE FRUIT Disease Status Report – Virginia

1. Summary. Green tip 50% was recorded on Fuji on 7 March in Rustburg, 14 March in Tyro, 18 March 2022 in Winchester. The 2022 growing season was abnormally wet year (Fig. 1). We had a cold spring that switched to above average warm temperatures on 23 and 24 April. Wet weather favored severe Juniper rust infections, four major apple scab infections, many apple bitter rot and Marssonina Leaf and Fruit Blotch infections. A number of fire blight infections depended on latitude in Virginia: 1 – 3 In Winchester, 6 in Tyro VA, 5 – 8 in South Virginia. Apple bloom started on early cultivars on 1st April (Tyro, VA), 4th April (Charlottesville, VA), 6th April (Fincastle, VA) and 12 April (Winchester, VA). Less than 1 % of flowers opened on 1st April in ‘Pink Lady’ in Winchester. Full bloom was on or around 24-26 April in Winchester VA.

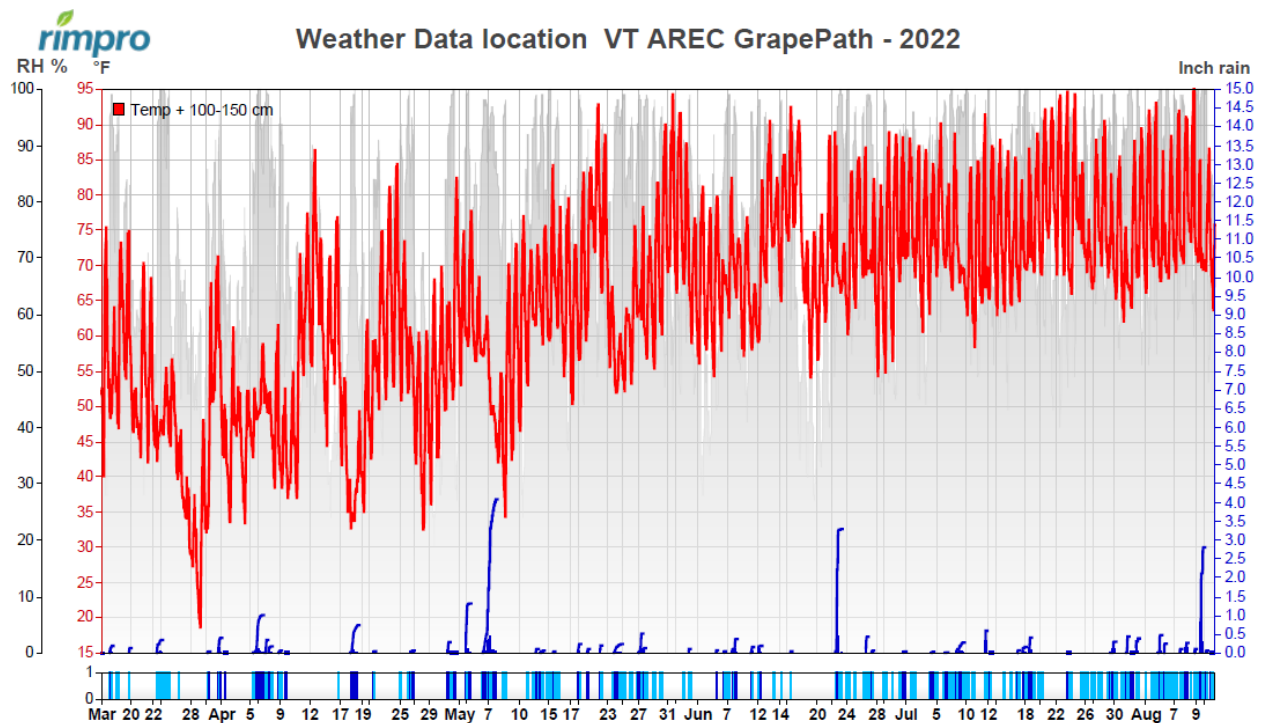


Figure 1. Weather conditions in Winchester VA, recorded by a weather station. Top graph: red line shows temperatures (left y-axis in red), blue curved lines show rain lengths and amounts in inches (right y-axis in blue), grey background represent relative air humidity (RH) in % (far left y-axis in black). Bottom graph in (A) and (B) with dates shows the length of rain (dark blue) and of wetting periods after the rain stopped or from dew (light blue). Used by permission of RIMpro B.V., Netherlands: <https://www.rimpro.eu/>

2. Apple scab. Based on historical (actual) weather data (Fig. 2), scab had four major infections based on the RIMpro apple scab prediction model (starting from GT, HIG-TC). Before the first major infection on the 23 March at GT bud stage (Winchester), one medium infection period was recorded on 17 March at GT and was worth protecting against in orchards that had scab last year. There were 4 to 9 ascospore germination periods across Virginia that did not lead to infection and did not warrant fungicide application/s in commercial orchards that did not have

scab last year since conditions after rainfall were cold of rain quickly dried and these were unfavorable for germinating spores to establish an infection. We were not able to find first apple leaf scab lesions in Winchester as we did not have an untreated control in any trial to use. The prevailing cold weather this spring, with brief snippets of warm weather, has severely slowed down disease symptom occurrence. In terms of scab, we never had a high pressure here at AREC to begin with and also we applied early fungicide applications on all blocks, so scab has not yet expressed regardless of the large amount of last year's scab leaves we introduced in one Fuji block. In Winchester, primary scab season was over on 9 May (all ascospores were discharged from pseudothecia according to RIMpro's maturation model).

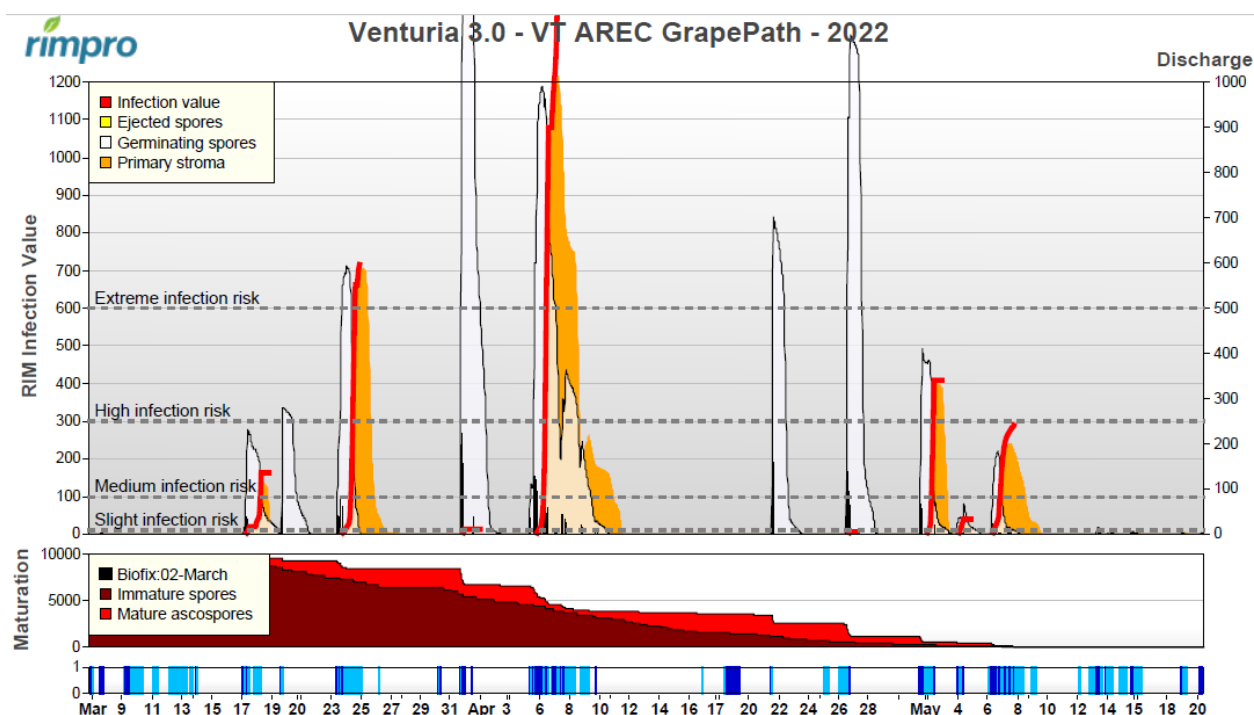


Figure 2. Apple scab infection periods in 2022 for Winchester VA in RIMpro model. White camel hump-like areas labelled “Germinating spores” show cumulative number of *Venturia inaequalis* ascospores that germinate over time and are read on the right-side vertical Y-axis scale that is labelled “Discharge”. The red curved lines are the RIM infection values which, when divided by 100, are roughly the percentage of the total season’s ascospores that are likely to cause infection in any given infection period. Read each curve’s peak RIM infection value/s using the vertical Y-axis scale on the left side of the graph labelled “RIM Infection Value”. Orange areas called “Primary stroma” just after each red curved RIM line represent scab lesions that were initiated by infection and are incubating in the leaf. Orange depicts the time during which kick-back fungicides can be applied. The light red areas in the middle “Maturation” graph is the proportion of mature ascospores that are ready for discharge with wetting events, whereas the dark red area is the proportion of immature ascospores remaining in leaf litter. Image used by permission of RIMpro B.V., Netherlands. <https://www.rimpro.eu/>

3. Fire blight conditions in Virginia were very favorable at early to mid-bloom with first infections predicted for 14-16 April, 23-26 April, 2-4 May (Fig. 3). In the experimental apple orchard in Winchester, which we inoculated with *E. amylovora* on 23 and 24 April 2022, first fire blight symptoms were visible on 17 May: [FIRST BLOSSOM BLIGHT SYMPTOMS VISIBLE IN WINCHESTER AT AREC TRIAL \(INFECTIONS 23-25 APRIL\)](#), blog from May 17, 2022. More than several growers from central VA reported fire blight symptoms occurring on pears and apples leading to loss from 10-60% crop in 2022 and canker formation that in Gala led to tree mortality.

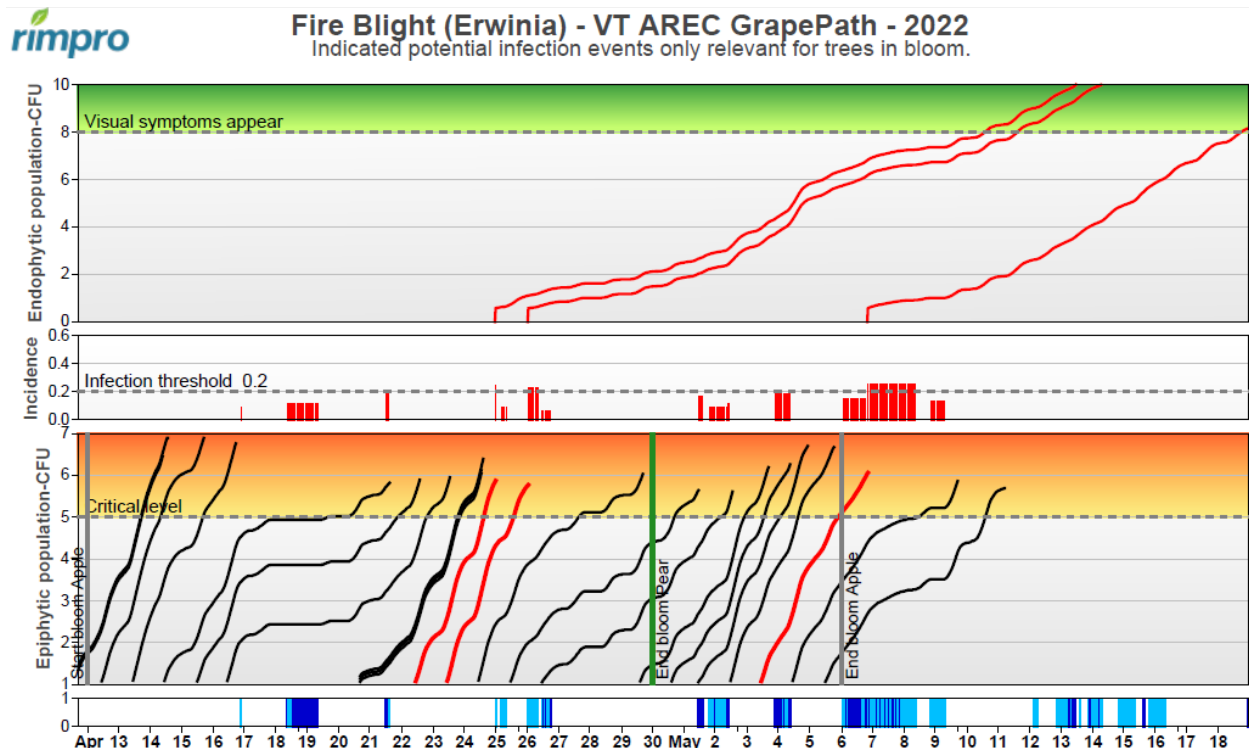


Figure 3. Fire blight infection periods in 2022 for Winchester VA in RIMpro model. Graph interpreter: Blossom blight infections are predicted to occur when the red bars in the center graph go through the dashed line indicating an infection threshold of 0.2. Upper graph red curved line indicates incubation of the infections and the time needed for visual symptoms to occur (blossom blight). Black/Red curved lines at the bottom graph show how bacterial populations grow on flowers: Any wetting that occurs after these line/s reach the orange area can trigger an infection. Lines start at 59°F when bees become active. Image used by permission of RIMpro B.V., Netherlands. <https://www.rimpro.eu/>

4. Cedar apple rust on leaves, quince rust on apple fruit, and powdery mildew symptoms in Winchester VA were first observed on 18 May on apple spur leaves of unsprayed ‘Ginger Gold’ and ‘Pink Lady’ trees.

5. Bitter rot conditions in 2022 led to severe infections on fruit and leaves if fungicides were not applied. First symptoms were visible in Winchester on July 13, 2022 and 7 to 10 days earlier than that date in Central and Southern Virginia.

HORTICULTURE

NEW JERSEY BLUEBERRY WEED IPM UPDATE

Carrie Mansue and Thierry Besancon
Sr. Program Coordinator and Extension Specialist
Rutgers University

In our observation in New Jersey during blueberry season, weed control seems to be a major issue. Typically, pre-emergence herbicide spray programs start in the month of March. Weeds emerge in July, by August they are out of control and herbicides will have no effect on them.

In 2021, a field study was conducted on 99 fields looking for five problematic weeds present in blueberry fields. The five problematic weeds observed were barnyardgrass, goosegrass, marehail, crabgrass, and nutsedge. On average of percent weed cover of the 99 fields goosegrass was the number one problematic weed at 22% average weed cover. Crabgrass was the second problematic weed at 6%.

Spray timing is key when it comes to herbicide placement. There are at least 4 spray timings in blueberry season. March time for spring pre-emergence sprays, May-June for post-bloom sprays, August-September for post-harvest sprays and November for fall pre-emergence sprays.

Objective for this study was to analyze herbicide spray programs. Look into the choices the growers are using and see if they are the best suited. Three farms were analyzed in late August to see what weeds had emerged. From the results, our first farm had golden rod and red sorrel. When looking over spray records, the grower sprayed two applications, one as a spring pre-emergence and two as a post bloom spray. His choices of sprays seemed to work great on annual grasses however he could have had a product in his post spray to help control the golden rod such as Stinger.

Farm number two had goosegrass, nutsedge, carpetweed in their fields. This grower went with a single spring herbicide application during pre-emergence timing. The grower could have decided to do a second application at the post bloom period such as Interline to help control any grasses, and broadleaf weeds that came up, as well as spray Sandea to help control nutsedge.

Farm number three went with a single pre-emergence herbicides application at spring timing. However, still had goosegrass, nutsedge and pigweed emerge. The farmer could have done a few different things in his spray choices but the main would be too possible add in a post bloom spray to catch any of the emergence weeds. They could have gone with Gramaxone to burn down the grasses and broadleaf weeds and use Sandea to help control nutsedge.

Timing and spray choices play a key role in controlling weeds in blueberry fields. A pre-emergence spray may not be enough to control weeds and growers may have to go out and apply more than just one application. Getting growers to transition to applying herbicides in the fall might be a key part in helping with weed control in blueberry fields.

PLANT PATHOLOGY

MANAGEMENT OF PEAR SHOOT BLIGHT AND FIRE BLIGHT CANKERS WITH PREVENTIVE APPLICATIONS OF REGALIA

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Meredith²

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Winchester, Virginia 22602

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Cankers caused by fire blight are dead zones of bark on branches, central leader, or rootstock of pome fruit trees. Cankers develop after *Erwinia amylovora* invades wood from diseased flowers, shoots, and rootstock suckers and can girdle pear branches, trunk and rootstock, causing tree death. Due to genetically higher susceptibility of pears to fire blight, cankers on pear wood are larger in comparison to apple, develop rapidly, and more often lead to tree death. Sudden outbreaks of shoot blight on pear trees leading to canker development have been a problem for the U.S. growers in the recent past. We focused on developing spray programs with biorational materials that aim to prevent shoot blight severity and development of cankers from infected shoots on pear. Our focus was focus on extract of giant knotweed *Reynoutria sachalinensis* (Regalia) which is an SAR activator candidate (SAR = Systemically Acquired Resistance). When Regalia was trunk injected twice on mature, high-density trees of apple cv. Honeycrisp, i.e. at half-inch green and at pink bud stages (2 X 76.8 fl oz/A), it provided 36% control of shoot blight incidence. During two years, we evaluated efficacy of trunk-injected and spray-applied Regalia for pear shoot blight and canker management and compared it to spray applied and trunk-injected antibiotics. We used different application methods to determine how to improve efficacy of Regalia as on pear. The spray program with five applications of Regalia (5 X 30.7 fl oz/A) on 6-year-old trees of cv. Bartlett gave 100% control of shoot blight severity and canker incidence in both years of evaluation. Trunk injection of Regalia in fall prior to the spring of the experiment allowed 75% of shoot blight severity and 38.5% of canker incidence. In the second experiment year Regalia injected in spring provided 86% control of shoot blight severity and 89.8% control of canker incidence. Antibiotics oxytetracycline and streptomycin did not provide consistent control when two experimental years were compared. In the first year, both oxytetracycline (trunk injection and foliar sprays) and streptomycin (foliar sprays) were effective by providing 95%, 100% and 86% control of shoot blight, respectively. Additionally, these provided 91%, 100% and 84% control of canker incidence, respectively. In the second experiment year they were not effective, allowing 69 – 96% of shoot blight severity and 70 – 92% of canker incidence. Regardless of the inconsistent effect of antibiotics, five preventive spray applications of Regalia could be used to prevent shoot blight severity and prevent development of deadly cankers on wood of pear trees. Antibiotics are not recommended for shoot blight control in commercial orchards due to risks of antibiotic resistance. Therefore, Regalia spray program we evaluated which includes five preventive foliar application of 30.72 fl oz/A could serve as a valuable tool to manage pear shoot blight and prevent canker-related tree

deaths without risking emergence of *E. amylovora* resistance. However, more experiments with Regalia are needed on older bearing pear trees to confirm our efficacy results.

DETECTION AND QUANTIFICATION OF LIVE *ERWINIA AMYLOVORA* CELLS IN FIRE BLIGHT CANKERS WITH VIABILITY DROPLET DIGITAL PCR

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Erwinia amylovora (*Ea*) endangers commercial apple and pear production worldwide. Fire blight cankers develop after *Ea* invades pome fruit tree wood after infecting flowers, shoots, and rootstock suckers. Cankers can girdle the branches or a rootstock or scion stem leading to tree-top or whole tree death. The pear and apple growers in the U.S. rated fire blight as top priority for research in the last 4 years. However, basic tools for investigation of fire blight cankers are limited. The bacterium *Ea* overwinters in fire blight cankers and its populations and physiological state can be impacted by the multiple abiotic and biotic factors. In some cases, environmental conditions can cause stressed *Ea* cells that do not form colonies on solid microbiological media. Since culture-dependent techniques might not be reliable to determine *Ea* cell viability due to inaccurate quantification of viable but non-culturable cells, and due to presence of saprophytic microbes that grow faster than *Ea*, we decided to use digital (d)PCR to detect and quantify this pathogen in cankers. The classic PCR diagnostic assays do not discriminate DNA from live and dead *Ea* cells and cannot quantify live *Ea* populations. After we developed a viability digital (v-d)PCR assay based on chip QuantStudio 3D dPCR platform (QS3D dPCR) and tissue protocol using propidium monoazide (PMAxx) to detect and quantify live *Ea* cells in pear and apple cankers, we faced some drawbacks of dPCR platform and protocol for sample processing. QS3D dPCR capacity is low in terms of the number of samples per one run, the loading chips is slow, and our sample processing by hammering inside of resealable plastic bags is time consuming. We transferred our previous protocol to a new, Bio-Rad QX200 droplet digital (dd)PCR platform and improved sample processing procedure. We tested 7 different DNA extraction kits and manual methods to increase the DNA extraction efficiency from apple bark. To rapidly homogenize canker tissue, we used a SPEX Geno/Grinder 2010 homogenizer with a large tube block for 50 mL polycarbonate vials including steel beads. The homogenizer allowed rapid processing of 6 canker samples in a single run. Qiagen DNeasy Plant Mini Kit provided the highest DNA extraction efficiency averaging 64%. The automatic homogenizer also improved the reproducibility of the DNA extractions, likely by generating smaller tissue particle sizes in macerating the cankers. The QX200 ddPCR assay revealed a dynamic range with lower and higher limits of quantification of 7.2×10^2 and 7.6×10^7 copies/mL, respectively. These values improved the lower and higher limits of quantification by 0.2 and 0.6 orders of magnitude previously reported for the QS3D dPCR platform (3×10^3 and 4×10^7 copies/mL). The QX200 ddPCR can process up to 96 samples in one run, allowing high throughput and accurate quantification of target copies. In combination with the PMA treatment,

our ddPCR assay allowed a good discrimination between live and dead cells. The resulting v-ddPCR assay will allow future evaluations of resistant pome fruit tree germplasm, management options for *Ea* in cankers, and provide further dissection of *Ea* life cycle and epidemiology.

COLLETOTRICHUM SPECIES CAUSING APPLE BITTER ROT IN VIRGINIA, APPLE CULTIVAR SUSCEPTIBILITY, AND FUNGICIDE OPTIONS

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Apple bitter rot disease has been on the rise in the last 15 years, endangering production of apple fruit (*Malus domestica* Borkh). Multiple species in the *Colletotrichum acutatum* and *C. gloeosporioides* species complexes (CASC and CGSC, respectively) are causing this disease. We recorded apple fruit losses in Virginia ranging from 24 to 98% in 2021. This led the commodity groups in the U.S. to rate summer diseases like bitter rot and their management as the top priority for research in 2021 and 2022. Prior to harvest we determined that fruit losses were 83% on cv. Granny Smith, 54% on cv. Fuji, 53% on cv. Idared and 47% on cv. Honeycrisp. In few organic orchards, damage was 33% on cv. Goldrush and 24% on cv. Enterprise, while in one cider apple orchard, damage was close to 98%. So far, about 20 *Colletotrichum* species have been reported in literature to cause bitter rot on apple fruit and Glomerella leaf spot worldwide. The most reported species in the U.S. are *C. fioriniae*, *C. nymphaeae* in the CASC, and *C. fructicola*, *C. chrysophilum*, *C. noveboracense*, *C. henanense*, *C. gloeosporioides sensu stricto* and *C. siamense* in the CGSC. We previously determined that composition and frequency of *Colletotrichum* species varies geographically and hypothesized that they will likely change with latitude. Identifying the *Colletotrichum* spp. that cause apple bitter rot is an essential step in improving the management options because multiple pathogen species and not only one are exposed to the applied fungicides, thus complicating resistance management strategies. These species differ in fungicide sensitivity, virulence, optimal temperature for growth and likely have different genetic predisposition for resisting fungicides. We collected over 600 *Colletotrichum* isolates in Virginia, originating from 36 commercial farms. With multi-locus phylogenetic analyses after sequencing three partial genes for CASC, and 7 partial genes for CGSC, 82 representative isolates were identified as *C. fioriniae*, *C. nymphaeae* (CASC) and *C. chrysophilum*, *C. siamense*, *C. fructicola* and *C. theobromicola* (CGSC). The three dominant species were *C. fructicola*, *C. chrysophilum* and *C. fioriniae*. After *in vitro* susceptibility assays on fruit of cvs. Fuji, Gala, Honeycrisp, Jonagold, NY-1 (also known as SnapDragon), NY-2 (RubyFrost), Red Delicious, Rome, Stayman and the immune of accession PI369855, by fruit inoculations with PDA mycelial plugs and spores of *C. fioriniae* and *C. chrysophilum*, we determined that all the commercial apple cultivars were susceptible to bitter rot, with the cv. Honeycrisp as the most susceptible and the accession PI 369855 the most tolerant to bitter rot. *C. siamense* and *C. theobromicola* were the most virulent, producing the largest and deepest rot lesions on inoculated fruit of cv. Honeycrisp. We demonstrated that the frequency and

prevalence of *Colletotrichum* in the Mid-Atlantic U.S. changes with the latitude, leading to more *Colletotrichum* spp. diversity in the lower mid latitudes. Species identification, geographical distribution, and cultivar susceptibility data are all cornerstones of successful management of bitter rot as a growing problem in apple production in the U.S and worldwide.