December 2020

National Clean Plant Network

NCPN Network News

As the year 2020 draws to a close, “good riddance” has become a common refrain. It has been a year that challenged us all. But hopefully—eventually—we can look back and discover that we learned a few positive things about ourselves. Perhaps we became more nimble, as we rolled with a constant state of change and turmoil. Perhaps we have a bit more empathy for those whose lives have been upended and continue to face so much uncertainty. And, just maybe, we have discovered a reservoir of patience and optimism for navigating a path back to *normalcy* all the while recognizing that *normal* may look very different in the future. So, as this year comes ungracefully to a close, take a moment to appreciate your own personal growth and resilience, and consider reaching out to those who need a little bit of your strength.

In this final newsletter for 2020, we take stock of a few of the things we accomplished as a Network and look forward to our hopes and plans for the year ahead.

NCPN Roses New Virus Positive Control Collection Will Help Increase Accuracy of Diagnostics

The current collection of 60 entries has plants infected by the following viruses: apple mosaic virus, Prunus necrotic ringspot virus, rose yellow vein virus, blackberry chlorotic ringspot virus, rose spring dwarf associated virus, Rosa rugosa leaf distortion virus, rose cryptic virus, and rose yellow mosaic virus.

A collaborative effort between the National Germplasm Resources Lab at USDA-ARS, Foundation Plant Services at University of California-Davis and Texas Plant Disease Diagnostic Laboratory at Texas A&M University, is working to provide standardized rose virus controls essential for reliable diagnostics. The three partnering institutions have identified criteria for inclusion and are determining which rose varieties and viruses will be maintained in the collection. Material from the collection will be maintained in a freeze-dried form so it can be available all-year round. Our knowledge of rose viruses has grown significantly in recent years. When the first edition of the *American Phytopathological Society Rose Compendium* was published in 1983, it included 11 graft-transmissible rose diseases and only three were real viruses. The third edition, currently in development will include upwards of 30 viruses.

NCPN Hops to Expand Clean Planting Offerings with Plugs in 2021

Rooted hop plugs will be available in 2021, making clean planting material more accessible to small growers and backyard enthusiasts. The hop foundation collection has 40 public varieties available, including the newly re-released Mt. Hood variety. NCPN-Hops now has a working assay for Citrus Bark Cracking Viroid (CBCVd) for incoming hop introductions. In 2021, all foundation plantings will be retested to ensure all material is free of CBCVd.

NCPN Berries Implementing New Diagnostics Technology

In the last few years there has been a revolution in biology. High Throughput Sequencing (HTS, also known as *next generation sequencing*) has made previously cost-prohibitive, complex studies feasible for a significant number of scientists and biotech companies. In a nutshell, HTS allows for the massive sequencing of any type of organism from animals to plants to pathogens for a cost that is roughly a million times less of what was at the turn of the century.

How does HTS affect the berry industry? Other than the obvious application of genome sequencing, allowing for the better understanding of plant functions, HTS has major implications in diagnostics. USDA-National Clean Plant Network (NCPN) funding has allowed for the implementation of the technology in berry crops. The NCPN-Berries Centers in Arkansas, North Carolina and Oregon are applying HTS when testing new breeding accessions before they are released as new cultivars. This material has the highest health status possible, tested for all known but most importantly unknown viruses that affect berry crops.

In the coming year, NCPN-Berries anticipates finalizing guidelines for Pathogen-Tested Certification Programs for Nursery Stock Production. Draft guidelines are currently under review in pilot studies in Michigan, Oregon, and the state of Washington.

For more information visit http://virfind.org and ncpnberries.org

Bob Martin's Sort-of-Retirement

Bob Martin, past Chair of NCPN Berries and the USDA-ARS Research Leader and Research Plant Pathologist at the Horticultural Crops Research Unit in Corvallis Oregon, officially retired from USDA effective December 31, 2019. However, he has been working part-time during the transition of leadership. The new Center Director is expected to be announced soon. Once Covid-19 is under control, Bob hopes to resume his travels!

NCPN Fruit Trees Continues to Expand Products and Services

The Southeast Budwood Program in South Carolina is in transition and will be renamed the Clemson Clean Plant Center. As such, it will offer the full array of clean plant services: diagnostics, therapeutics, and a foundation collection.

As a result of changes in domestic pome fruit testing requirements, CPCNW in Prosser, Washington released 41 apple and pear cultivars in October 2020, including 6 public accessions.

The NCPN Fruit Tree group continues to work with the industry, growers, and extensionists to help promote best management practices to fight the Little Cherry Disease epidemic.

FPS Secures Greenhouse to Further Protect Foundation Grapevines

Foundation Plant Services (FPS) has been testing grapevines in its foundation vineyards for grapevine red blotch virus (GRBV) annually since 2013. In the Classic Foundation Vineyard Red blotch infection rates have remained extremely low, ranging from 0% to 0.21%. In 2020, none of the 4,270 vines were infected. In the Russell Ranch Vineyard (RRV), which was planted in 2011, red blotch was first detected in 2017 when five of 4,132 vines, only 0.1%, were infected. Since then, despite significant efforts to prevent the occurrence of the disease, the infection rate in the vineyard has increased to 0.5% (24 of 4,406) in 2018, 7.1% (339 of 4,761) in 2019, and 18% (788 of 4,367) in 2020.

FPS is working closely with other University of California scientists to monitor the foundation vineyards for potential vectors and track the spread of the virus. We will test all vines in the foundation vineyards individually on an annual basis and have discontinued distributing material from RRV. Grapevine material planted in the Classic Foundation Vineyard will continue to be available for distribution and is tested for GRBV as dormant canes prior to shipping. In addition, FPS has begun planning for a greenhouse to protect approximately 4,000 of FPS' most valued Foundation grapevines. FPS continues its commitment to clean plant health by maintaining the highest testing standard for our foundation vineyards and keeping the grape industry updated as new information becomes available.

To see the full press release, click here

NCPN Sweetpotatoes Stays Calm and Carries on Through Hurricane Season

Louisiana Sweetpotato Clean Plant Center

The LSU AgCenter (LSUAC) Clean Plant program for sweet potatoes has introduced to therapy about 10-12 advanced breeding lines from the LSUAC breeding program each year. For the past two years, the breeding program has grown novel lines for breeding and variety release in an isolated environment. Each of the advanced lines from these groups have been entered simultaneously into the traditional therapy program and at the same time we have established these in tissue culture without undergoing meristem-tip culture and entered them immediately into virus testing. In 2019, eight lines were entered into this early phase virus testing. In 2020, ten lines entered early phase virus testing in December and all were found clean by June. Read full report

Mississippi State University / Pontotoc Ridge-Flatwoods Branch Experiment Station

Mississippi State University-Pontotoc Branch (MSU-PB) constructed a new greenhouse in March 2020 that will be utilized as the "mother greenhouse" to supply sweet potato starter plant material from tissue culture in the clean lab for the Certified Clean Foundation Seed (CCFS) Program in Mississippi. The MSU-PB provided an estimated 216,000 clean sweetpotato slips in May and June of 2020. Read full report

Micropropagation & Repository Unit, Raleigh, North Carolina

The Micropropagation & Repository Unit (MPRU) in Raleigh started the 2020-2021 sweet potato season in September with the first delivery of nuclear plants to certified seed growers. North Carolina certified growers are still relying on potted nuclear plants but trays are gaining popularity. These certified growers are producing vine cuttings in protected greenhouses and will eventually produce the first generation of seed storage roots. The goal of the certified greenhouse producers is to produce over 3 million vine cuttings. Read full report

MPRU Sweetpotato team delivering the first 2020-2021 sweetpotato order. From left to right: Edgar Posadas, Tammy Abernethy, Hunter Stewart, Marilyn Daykin and Christie Almeyda.

NCPN Citrus is Introducing New and Licensed Citrus Varieties into California from Florida

The sustainability, competitiveness and economic success of the California Citrus Industry depend on the availability to the citrus growers of newly developed citrus varieties with important characteristics including resistance or tolerance to pests. However, new varieties are often protected, patented, or licensed and movement of citrus propagative material among states remains a complex regulatory issue. In 2015, California citrus growers visited citrus breeders and scientists of the University of Florida (UF) and United States Department of Agriculture, Agricultural Research Service (USDA-ARS) in Florida to observe different citrus varieties and hybrids in a Huanglongbing (HLB) environment and assess their potential value for the California citrus industry.

The lack of a well-defined protocol (e.g. material transfer agreements, introduction cost payments, maintenance and distribution of propagative materials) for the introduction and commercialization of protected/licensed citrus varieties coupled with the spread of the devastating disease Huanglongbing (HLB) and its vector, the Asian citrus psyllid (ACP), to almost all citrus producing areas in the world provided an opportunity to tackle the regulatory complexity of the interstate movement of citrus scions and rootstocks. Fast forward five-years, one Citrus Research Board (CRB) and two HLB Multi-Agency Coordination (HLB-MAC) grants, the regulatory and material transfer gridlock that once hindered the flow of citrus varieties from the Florida citrus programs into California was broken. At present, the Citrus Clonal Protection Program (CCPP) has in its citrus variety introductory pipeline 68 Florida-developed rootstock and scion varieties, 13 of which have been released from quarantine (see details at https://ccppdms.ucr.edu/ccppdms/upcoming_varieties). This very successful effort has now entered a new phase with various stakeholders discussing the routine movement of citrus budwood from different citrus programs into NCPN-Citrus centers, future protocols for the interstate movement of other citrus materials such as pollen and seed, and the formulation of a national program that is customizable for the needs of each citrus producing state to evaluate and commercialize citrus varieties independently of their point of origin.

Virologists Without Borders: Canada Establishes a Clean Plant Program for Grapevines

A CAD $6.2 million multi-partner funding commitment will allow Brock University's Cool Climate Oenology and Viticulture Institute (CCOVI) to support the Canadian Food Inspection Agency (CFIA) and the Canadian Grapevine Certification Network (CGCN-RCCV) to fast-track the virus testing of grapevine planting material. The program, **CLEan plAnt extractioN SEquencing Diagnostics, or CLEANSED,** is a jointly developed initiative between Genome Canada, Genome British Columbia, Ontario Genomics, Génome Québec, Brock University, the Canadian Food Inspection Agency, Agriculture Agri-Food Canada, the University of Victoria, Université de Sherbrooke and the Canadian Grapevine Certification Network. CLEANSED utilizes High-Throughput Sequencing (HTS) technology to detect multiple viruses in a grapevine, replacing more than 30 tests currently in use. CFIA and CGCN-RCCV will implement CLEANSED to ensure that Canadian grapevines start clean and stay clean. This project will help CFIA to ensure that imported and domestically produced grapevine varieties in Canada are free of regulated viruses and all non-regulated viruses of economic concern, while reducing the time and cost of testing, and improving sensitivity and accuracy.

Dr. Mike Rott, a CFIA Scientist who was instrumental in developing this program, has been collaborating with Foundation Plant Services' Dr. Maher Al Rwahnih for several years on the application HTS analysis in grapevine and fruit tree diagnostics. They have exchanged plant material and worked together to develop and refine protocols, validate assays, and create a bioinformatic pipeline. The National Clean Plant Network congratulates Dr. Rott and his team on establishing CLEANSED and ensuring greater access to clean plant material!
