

### **LCD Taskforce priorities 2021**

#### **Responding to the Little Cherry Disease crisis in cherries and other stone fruit: Needs and paths forward**

**LCD Taskforce:** Tobin Northfield, Tianna DuPont, Scott Harper, Bernardita Sallato, Teah Smith, Hanna Walters, Dena Ybarra, Jay Pscheidt, Per McCord, Elizabeth Beers, Chris Adams, Louis Nottingham, Rodney Cooper, Karina Gallardo, Ashley Thompson, Karen Lewis, Cindy Cooper, Laurie Guerra, Mike Bush, Keith Matthews, Frank Wolf, Dave Epstein, Garrett Bishop, Dale Goldy.

**Context:** The Little Cherry Disease Taskforce met on 19 May 2021 to discuss factors limiting our ability to respond to urgent and critical threats of Little cherry virus and X-disease phytoplasma for cherry and stone fruit industries in the Pacific Northwest. The group included growers, crop consultants, government members, members of the research and extension community, and members of industry supported organizations to support research and policy matters. For Washington and Oregon, the general needs are the same, but in some instances the specific paths to meet those needs sometimes differ by state and/or region, in which case we describe them separately. We have separated the constraints and needs into two categories: improving the efficiency and capacity in our current response, and research that will enable better response in the future.

A key theme to the problem of cherry disease caused by X-disease phytoplasma and/or Little cherry virus is that this is an area wide problem, and pathogens and insects that vector them do not care about state or farm borders. Therefore, we need to work together at local and state levels to prevent spread of disease pathogens from untreated/unmanaged sites back into areas actively managing for LCD. This means engaging with members of the cherry and stone fruit communities that may not have the means or motivation to respond to the disease crisis caused by X-disease and Little cherry virus.

#### **Immediate needs to overcome current limitations to improve current response**

**Constraint:** *Insufficient testing capacity.*

Path forward (Oregon): Recent retirements in Oregon USDA plant pathologists (Robert Martin and Robert Spotts) have left a large vacancy in the plant testing expertise and capacity in Oregon and need to be replaced.

Path forward (Washington): Improve capacity through: i) continued support for commercial labs, and ii) increased support for sustained diagnostic testing capacity at WSU or other publicly funded labs to conduct area-wide surveys.

**Constraint:** *Lack of grower/consultant knowledge and application of best management practices to reduce the spread of X-disease and Little cherry disease.*

Path forward A: Increase the number of Extension personnel to guide the industries response. This is most pronounced in Oregon, where there is a single Extension person working to meet the needs of the entire Oregon tree fruit industry.

Last updated: July 1, 2021

Path forward B: Educational materials and training to increase effective identification, scouting, sampling, tree removal and vector management.

**Constraint:** *Plant testing costs are high, reducing the industry-wide response.*

Path forward: Identifying sources of funding to offset costs, potentially through subsidies that would incentivize testing. This is particularly important for smaller farms with less financial resources to address this need. Infected trees do not immediately show symptoms but can transmit the phytoplasma. Therefore, we need to incentivize testing of at-risk trees (near other diseased trees) to reduce spread within and between blocks. Research-informed solutions to reduce costs, turn-around time, and improve detection of recent infection are also needed, and is further described in the “needs for future responses” section below.

**Constraint:** *High cost of tree removal, replanting and time to maturity disincentivizes removal, promoting disease spread. Furthermore, infected blocks produce reduced, but potentially financially viable yields for multiple years creating short term disincentives for tree removal.*

Path forward (both states) A: The USDA FSA Tree Assistance Program is helpful to encourage the removal of diseased trees. However, this program needs to be streamlined to improve the speed of the response to prevent continued spread of the disease. Lag times and need for extensive evidence of disease infection discourage tree removal, potentially allowing pathogen spread within orchards and to neighboring farms. Furthermore, funding should be used to offset lost income, rather than just the costs of tree removal. Orchard land cannot be immediately replanted with cherries or stone fruit due to disease persistence in living tree tissue (roots) surviving to the following year, and trees take years to come back into cherry production following replanting.

Path forward B: Provide cost share for tree removal which is independent of replanting and with a quick-streamlined application process. Cost share should be adapted to the particular economic constraints of operations of different sizes and scales, and to ensure programs are accessible to typically underserved communities and/or communities with reduced access to financial resources.

**Constraint:** *Because trees do not show symptoms until they bear fruit, planting and management of young non-bearing trees is of particular concern.*

Path forward A: *Ensure that trees planted going forward are certified to be free from Little cherry virus and X-disease phytoplasma.* Ensure sufficient supply of certified trees to replace removed trees. Increase funding for the Clean Plant Center Northwest to supply clean plant material to the industry. This includes increased staff and facilities to meet the high demand for plant material due to the large acreage being removed and risks associated with non-certified wood.

Path forward B: Currently trees are often produced by non-certified nurseries. Legislation is needed to ensure the use of propagative material sourced from pathogen-tested sources, both in state, or entering the state, and funding is needed to expand the state certification program to ensure that nursery blocks can be tested.

Path forward C: Develop and implement tree removal, planting and management strategies to reduce the probability of infection by Little cherry virus and X-disease phytoplasma. This should include an estimate of local pathogen pressure to assess re-infection risks.

### **Needs to improve future responses**

***Constraint:*** *Currently the only method of reliable disease detection is at harvest, allowing for transmission to occur not only pre-harvest, but throughout the early stages of the tree's life before it is fully matured. This is particularly needed for X-disease phytoplasma.*

Path forward A: Research plant-pathogen interactions to better understand the impacts of the phytoplasma on tree pathogenicity and virulence and relationships to environmental conditions. Identification of these physiological changes may allow for methods to detect the changes and allow for early disease detection, and decision making.

Path forward B: Conduct research to study the biotic and abiotic factors that influence phytoplasma tropism and titer during the course of an infection from inoculation to systemic infection and symptom expression.

Path forward C: Develop methods for rapid, reliable identification of infected trees in orchards and nurseries.

***Constraint:*** *Lack of knowledge of the leafhopper and pseudococcid insect vectors that vector the X disease phytoplasma and Little cherry virus 2 (leafhoppers for X disease in particular) limit our ability to control the insects and identify alternate hosts that may act as disease reservoirs in the orchard landscape.*

Paths forward A: Research to identify all vectors of each, X-disease and Little cherry virus 1, and Little cherry virus 2.

Paths forward B: Research on vector biology, behavior, phenology, and host plant use, particularly for leafhoppers, including impacts of phytoplasma on leafhoppers.

Paths forward C: Better understand ecological interactions between vectors and other species to identify potential biological control agents, with particular emphasis on leafhoppers, given the lack of knowledge.

Paths forward D: Development of an integrated pest management program for X-disease vectors that can be implemented areawide.

Paths forward E: Research to better understand X-disease vector genetics to capitalize on genetic-based control methods.

***Constraint:*** *Currently there are no varieties of cherry or other stone fruit crops resistant to X-disease phytoplasma or Little cherry viruses.*

Path forward A: Funding for breeding programs can develop resistant or tolerant varieties to ensure productivity despite presence of X-disease phytoplasma, Little cherry virus 1 or 2.

Path forward B: Development of treatment protocols for infected trees.

***Constraint:*** *On-farm research may lead to infection of surrounding orchards, particularly, as is often the case, when conducted on commercial orchards*

Last updated: July 1, 2021

Path forward: Develop and support designated facilities (ideally a contained, screened-in orchard) to conduct research in realistic scenarios where trees can be infected while limiting pathogen spread to commercial orchards.

***Constraint:*** *Currently the industry is using many approaches to remove diseased trees and it is unclear which is most effective. Furthermore, methods depending on herbicide treatment are not available for organic farms.*

Path forward: Research tree removal techniques and re-establishment will allow for development of standard, effective tree removal techniques.