



The NCPN crop networks are dedicated to educating our constituents on best management practices for planting with virus-indexed propagative material. Toward that end, each group has compiled a list of five things they feel are essential to help you “start clean, stay clean” and maximize the quality and yield of these specialty crops. Please reprint and forward this document to others who may benefit from this information.

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nationalcleanplantnetwork.org

Five Terms Defined for Sweetpotato Clean Plant Programs

1. Virus indexing is a method used to determine the presence and identity of sweetpotato viruses. The Brazilian morning glory (*Ipomoea setosa*), a close relative to sweetpotato, is sensitive to sweetpotato viruses. *I. setosa* is referred to as an indicator species because when infected sweetpotatoes are grafted to it, virus symptoms develop and ‘indicate’ that the plant is infected with viruses. Polymerase chain reaction (PCR) assays are also used to detect nucleic acids of specific viruses.
2. Virus-tested means that plants have been screened and found apparently negative for the presence of known or targeted viruses affecting sweetpotato.
3. Scientists avoid the term "virus-free" because we only test for viruses that are known to infect sweetpotato. Furthermore, it is impractical to test every plant produced by the NCPN- Sweetpotato Clean Plant Centers, an estimated 384 million plants in 2017.
4. The term “clean plants” refers to sweetpotato plants generated through a uniform process agreed upon by NCPN- Sweetpotato Clean Plant Centers. This includes standardized virus-testing procedures, plant therapy to generate nuclear stock plants free of known sweetpotato viruses, and collaboration with state regulatory and crop improvement agencies to limit reinfection during the propagation of clean plants in greenhouse and field environments.
5. Reinfection happens when clean plants are exposed to sweetpotato virus vectors. Sources of viruses may be wild morning glories or cultivated sweetpotatoes. Aphids vector the most common group of sweetpotato viruses in the U.S., but whiteflies also transmit some uncommon sweetpotato viruses.

Five Important Facts About Diseases in Citrus

1. The citrus industry worldwide is being challenged by the spread of Huanglongbing (HLB), a graft-transmissible disease associated with species of the bacterium *Candidatus Liberibacter*, which is vectored by the Asian citrus psyllid (ACP), *Diaphorina citri*.
2. NCPN-citrus has grown to include 10 centers in 9 US states and territories with citrus foundation blocks maintained in protective structures to exclude ACP and HLB and other vectors and citrus diseases.
3. NCPN support allowed high throughput citrus diagnostics to flourish, which in return led to the increased availability of pathogen-tested citrus propagative materials, thus reducing infection rates in commercial citrus and promoting the use of NCPN produced materials among citrus enthusiasts and hobbyists.
4. NCPN supports the Citrus Clonal Protection Program (CCPP) at the University of California, Riverside, the citrus center that was the birthplace of basic citrus therapy and bioindexing technologies, establishing a citrus germplasm model system adopted by all citrus centers around the world.
5. To prevent the spread of citrus diseases, always use trees produced by licensed reputable nurseries that are using NCPN-produced pathogen-tested citrus propagative materials. Do not move citrus trees or tree parts within or into the US.

Five Tips for Preparing Fruit Tree Tissue Samples for Lab Virus Testing

1. Virus distribution changes with the seasons. In the winter, collect 8-10 inch one-year-old dormant bud sticks. In the summer collect flowers and leaf bud sticks from all major scaffolds and limbs. In the fall, collect 8-10 inch one-year-old branches of the current season's growth, including the leaves.
2. Immediately place the sample in a labeled (tree, row, grower, GPS etc.) sealed plastic bag (e.g. Zip-Loc).
3. Do not add additional moisture in the bag.
4. Do not allow the bag to sit in the sun (the samples heat very quickly). Keep the samples cool and shaded.
5. If ice packs are used when transporting samples, do not place bags of leaf samples directly against the ice. This will freeze the tissue and labs will not be able to test the sample reliably. Use several layers of paper or bubble wrap to insulate the sample.

Five Facts About Grape Viruses and NCPN-Grapes

1. Wine quality is affected by a very common disease, leafroll disease, which reduces sugar content and color of grapes and increases acidity. Leafroll disease is caused by one or more viruses in the grapevine leafroll virus species.
2. Archived leaf tissue in the UC Davis Herbarium from the 1940s was found to be infected with the newly discovered (2012) Grapevine red blotch virus indicating that it has been around at least since then.
3. Every year, over 100 grapevine selections are treated for virus elimination in NCPN-associated labs.
4. NCPN-Grapes has the largest Tier 2 Committee – 21 members from industry, extension/research and state regulatory agencies representing the eastern and western US.
5. NCPN-Grapes centers distribute more than 700,000 clean grape cuttings, buds, and plants to industry.

Five Ways to Manage Rose Rosette Disease

1. Monitor for symptoms frequently (once per week).
2. Bag and remove diseased plants quickly (there is no known cure for Rose Rosette disease). Bagging is necessary to prevent further spread of the disease via the air borne mite vector. Remove the root ball. This does not have to be bagged as the mite does not reside in the root ball. The infected plants should be destroyed by burning or transporting to a landfill. Do not compost.
3. A new rose may be replanted in the same space after one week has passed.
4. Miticides can be used to control the mite vector to prevent further spread of the virus.
5. The spread of the mite vector and thus the virus can be decreased by not planting roses too closely to each other and by interplanting roses among non-rose plants or structures.

Five Tips for Safeguarding Berry Farms from Virus Disease

1. Plant resistant varieties where available.
2. Never propagate from material that has not been virus-tested.
3. Know the viruses that circulate in your area and their vectors.
4. Never plant in fields with history of soil-borne viruses.
5. Avoid areas with high incidence of pollen-borne virus. You cannot control pollen.

Tips for Managing Hop Viruses in the Field

1. Plant with propagation material that is virus indexed.
2. Destroy and replace diseased plants with virus-indexed plants as soon as possible to limit spread.
3. Start work in virus-indexed yards before working in infected yards, to preclude transferring pests and other vectors between locations.
4. Decontaminate and wash equipment to remove sap and plant residue when moving between yards.