



WHAT IS THE BEST PROTECTION AGAINST HVX?

Know whether the original sources of plants you buy test for HVX. Your retail source for hostas will know where its plants come from and if the original sources test for HVX. Wholesale vendors provide this information to their customers.

AREAS THAT WARRANT FURTHER INVESTIGATION

⇒Root/soil contamination issues. We found that clean plants could be contaminated by soil and infected debris. We need to study what occurs and why.

⇒The effectiveness of different cleaning solutions on tools exposed to HVX (important for field crop production).

⇒Latent development of the virus. Test plants left in the field will be monitored and tested for up to three years to address this issue. We will observe plants inoculated with different isolates of HVX, plants of varying ancestry infected with the virus and plants inoculated by different mechanical means.

⇒Methods of harvest and propagation by growers.

⇒The role of harvesting and wash water in spreading the virus.

⇒Whether HVX is truly hosta-specific.

The American Hosta Society

www.hosta.org

The American Hosta Society is dedicated to the study and improvement of the genus *Hosta* and the dissemination of general and scientific knowledge about hostas. There are many benefits for the members that result from these efforts, both social and in the nursery trade.

The AHS Board of Directors works hard to define and balance the activities and focus of the Society. Most ongoing activities are delegated to specific committees that function under the guidance of the Committee Chair and report to the President and the Board of Directors at regular intervals. In addition, many committees report their progress at AHS meetings and publish their findings (particularly in the areas of basic sciences and nomenclature) in *The Hosta Journal*.

To read about the entire HVX research project go to:

www.hosta.org/HostaVirusX.html

More photos are available at:

www.hosta.org/PDF/HostaViruses.pdf

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The American Hosta Society

Transmission of Hosta Virus X (HVX) Under Normal Conditions of Hosta Cultivation and Commercial Production



INTRODUCTION AND BACKGROUND OF RESEARCH

Hosta Virus X (HVX) was first identified and described at the University of Minnesota in 1996 (Currier and Lockhart, 1996). Since then, HVX has been found to occur widely in the U.S. as well as other countries throughout the world where hostas are grown. The danger posed by HVX to both hobby and commercial hosta cultivation has led to a need for a scientific study of the dynamics of HVX spread, in order to provide hosta growers and producers with the information needed to manage the disease.

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Hosta 'Gold Standard' with HVX



Hosta Virus X is a member of the plant virus genus *Potexvirus*. Potexviruses characteristically become highly concentrated in infected plants and are very stable outside the plant cell. They are not spread by insects, mites, fungi, nematodes, seed or pollen. Viruses like HVX are known to be spread only by vegetative propagation of infected mother plants or by infected plant sap that enters a healthy plant via non-lethal tissue damage (wounding). This mode of virus spread may possibly occur during normal gardening and commercial production, but there is no empirical evidence of its occurrence or probability. This research project is designed to provide research-based information.

GOALS AND OBJECTIVES

The study was designed by the AHS to address the hosta gardener's questions about Hosta Virus X. There are major concerns about this virus in both the home garden and in the ornamental horticultural industry. Our research project was designed to provide empirical data useful to the hosta gardener. An attempt is made in this study to clarify the method of HVX transmission and to understand the dynamics of Hosta Virus X spread, so steps can be taken to protect plants and gardens from the virus.

QUESTION: Can HVX be transmitted during normal cultivation?

Experiments were done to determine if HVX can be transmitted mechanically via tools, hands, fingers, plant debris in soil, or by root contact. In completed experiments, the virus was transmitted via tools and in soil infected with HVX plant debris, but not via fingers or uninjured root contact.

QUESTION: If HVX can be spread by the described cultivation practices, how long does the virus remain on tools and in soil?

Infected plant material kept in the refrigerator at 39°F (4°C) remained infective for more than nine weeks. Fresh infected plant material was always infective. Soil with HVX plant debris and root material was infective for more than two years. **It is necessary to remove all infected live plant debris before reusing soil.** Broken roots and plant parts can infect new plants.

QUESTION: If HVX remains infective on contaminated tools or in soil, what practical measures can be used to eliminate it?

All tested methods of decontamination — household detergent (Dawn), 70% alcohol and 10% solution of household bleach — were effective in eliminating infectivity of the virus. The decontamination process included intense scrubbing and cleaning of tools, hands, and pots to remove plant material, soil and sap. Viral material was visibly dislodged. **It is not enough to simply dip tools in cleaning solution. Tools must be scrubbed free of all dirt and debris.**

QUESTION: Is HVX transmission dose-dependent (titer-dependent)?

No difference in infectivity or speed of infectivity was related to the source or dose of the virus isolate. A significant difference in the rate of infectivity was dependent on the stage of plant growth. The virus was most easily transmitted **prior** to flowering and when the plant was rapidly growing in spring. **We were not able to transmit the virus while the plants were flowering in late summer/fall or dormant.**

QUESTION: Are all HVX isolates transmissible?

We collected and mechanically transmitted 15 isolates of HVX. We again noted that the success of **transmission** was not only **dependent on mechanical injury** with new or old infection, but **also on the season** in which the contact occurred.

QUESTION: Are there any HVX resistant hosta varieties?

While this question warrants further study, we were able to infect with HVX all hosta varieties tested under the proper conditions in either the field or greenhouse. At this time **we believe all hostas are susceptible to the virus.** We understand this to mean that certain varieties are not more or less susceptible. It is the timing of exposure to the virus that will result in infection.

QUESTION: What is the best way for home growers and nurseries to test for HVX?

ELISA testing through Plant Disease Clinics and certified labs is the most reliable method of testing. The new **rapid test strips** are reliable and portable. The strips can be used in the field or greenhouse and work with leaf or root material.



HVX-infected Hosta 'Sum and Substance'