Orchid Viruses

Presented by Desiree Watson May 2022

HOW MANY VIRUSES INFECT ORCHIDS?

- There are now more than 30 viruses which have been reported to infect orchids.
- The older, most common of these are **Odontoglossum ringspot virus (ORSV)** and **Cymbidium mosaic virus (CyMV)**.
- Other newer viruses reported include CymMV, DenMV, PhCSV, CyRSV, CMV, OFV and many more.
- It is not a case of your orchid is “Virused”, but more importantly, due to your acquisition and cultural practices, how many viruses you have accumulated.

https://www.aranbeemorchids.com.au/hello-orchid-growers-july-2019/ thank you Ross Maidment

Orchid Virus - Symptoms

- **Symptoms:**
  - Chlorotic and necrotic **spots**, **streaks**, **lines** and **rings, mosaics**, in the **leaves**.
  - **Flowers** may show necrotic **spots** and **streaks** as well as **colour break**.
  - The virus, if present, is present in all parts of the plant.

- In botany, **chlorosis** is a condition in which leaves produce insufficient chlorophyll. As chlorophyll is responsible for the green colour of leaves, chlorotic leaves are pale, yellow, or yellow-white.

- Leaf **necrosis** (death of plant cells or tissues) is not a disease, but rather a symptom of disease or other distress the plant is experiencing. This symptom presents as many different forms, from dark watery spots on leaves or fruit to dry papery spots that may be tan or black.

https://staugorchidsociety.org/culturepests-viruses.htm

SYMPTOMS

- Symptoms vary widely between different genera.
- Other common symptoms include **reduced vigour**, flowers not **lasting as long and less prolific**, having **“bad season” of irregular flowering** and growth, and **necrotic streaking of flowers as they age**.
- It is very difficult to accurately diagnose virus by visual symptoms alone.

https://www.aranbeemorchids.com.au/hello-orchid-growers-july-2019/

https://bsppjournals.onlinelibrary.wiley.com/doi/10.5197/j.2044-0588.2018.037.003

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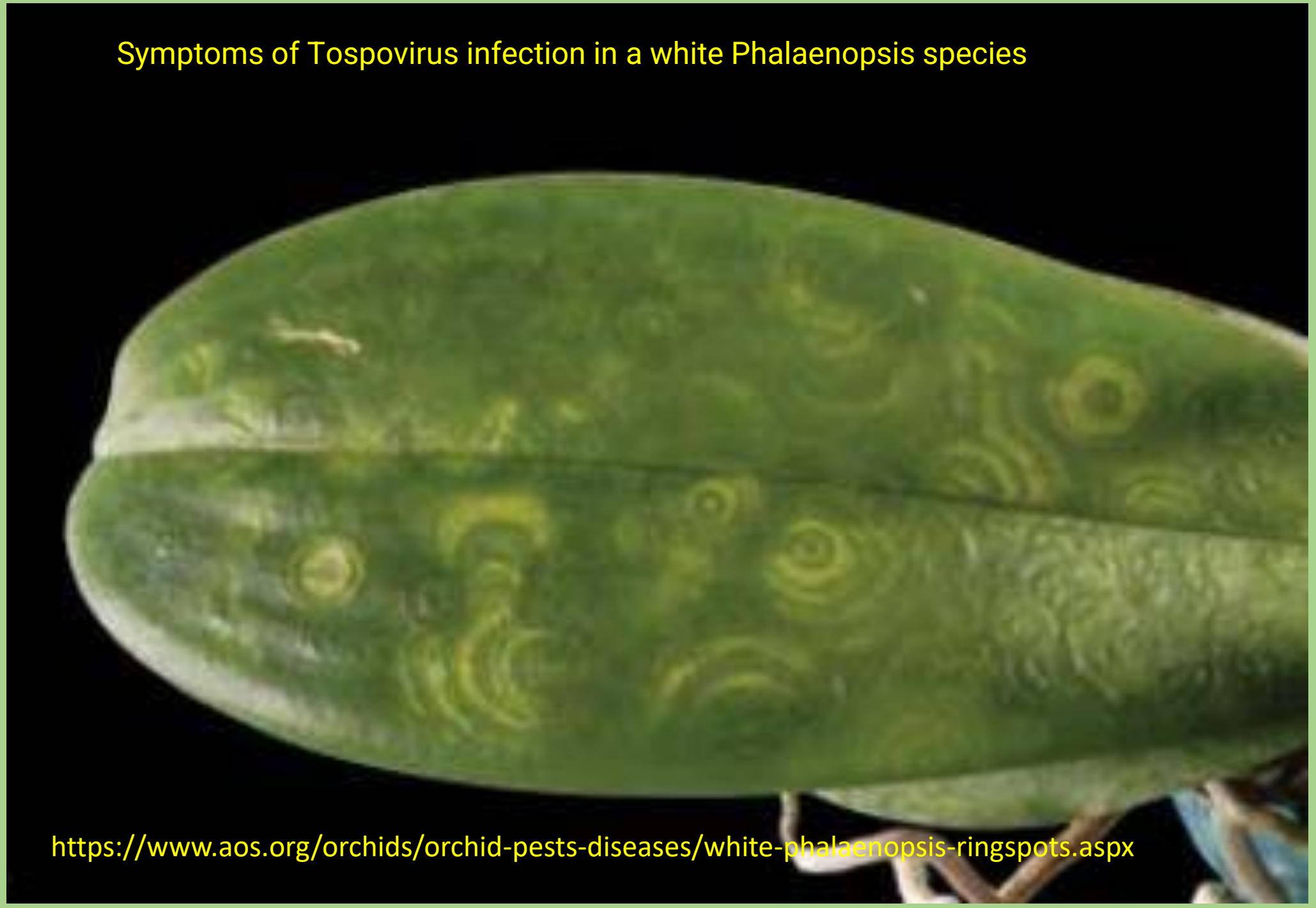
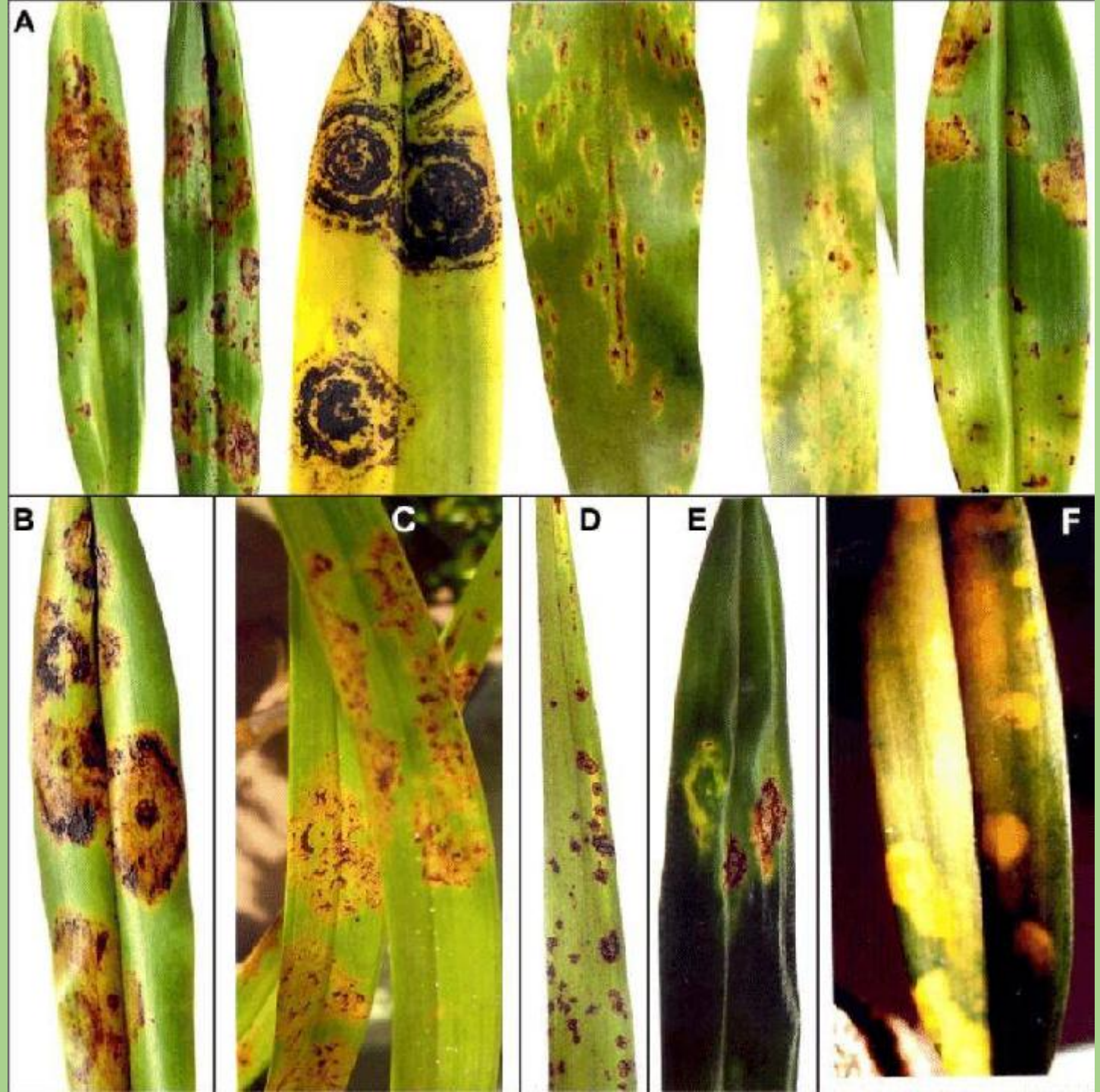
Symptoms of Tospovirus infection in a white Phalaenopsis species



https://www.aos.org/orchids/orchid-pests-diseases/white-phalaenopsis-ringspots.aspx

An annotated list of ornamentals naturally found infected by Brevipalpus mite-transmitted viruses
•December 2009
•Scientia Agricola 67(3):348-371
https://www.researchgate.net/figure/A-Chlorotic-flecks-and-different-patterns-of-chlorotic-spots-and-ringspots-caused-by_fig9_262520663



Odontoglossum Ringspot Virus (ORSV)

Cymbidium Orchid Society of Victoria
https://www.cosv.com.au/orchid-viruses

ORSV V shaped chlorotic marking

Orchid Fleck Virus (OFV)
Chlorotic markings produced by an OFV infection

Cymbidium Orchid Society of Victoria
https://www.cosv.com.au/orchid-viruses

chlorotic spotting is a common feature in OFV infections

Cymbidium Orchid Society of Victoria
https://www.cosv.com.au/orchid-viruses

Pay close attention to chlorotic markings. Even faint ones can indicate a virus!

Cymbidium Orchid Society of Victoria
https://www.cosv.com.au/orchid-viruses


Flower Colour Break
https://www.aos.org/orchids/orchid-pests-diseases.aspx

http://www.orchidboard.com/community/beginner-discussion/68975-color-break-catt-flowers-virus.html

http://www.orchidboard.com/community/pests-and-diseases/40817-colour-break-mean-virus.html

Cattleya leaf with black streaking caused by CymMV. By Dietrich E. Lesemann.

https://www.sciencedirect.com/topics/biochemistry-genetics-and-molecular-biology/cymbidium

Dendrobium leaves with sunken necrotic spots and necrotic stripes caused by a mixed infection of CymMV and DVNV. By Joachim Hamacher

https://www.sciencedirect.com/topics/biochemistry-genetics-and-molecular-biology/cymbidium

Chlorotic and necrotic ring spots and line patterns on ORSV-infected cymbidium leaves. By Dietrich E. Lesemann

https://www.sciencedirect.com/topics/biochemistry-genetics-and-molecular-biology/cymbidium

TESTING

- There are various methods of testing for virus from inexpensive to very expensive. Simple inexpensive tests include **serological assay** (ELISA) and more expensive and less available tests include **transmission electron microscopy** and RTPCR.
- The commonly available tests are only for a **couple of viruses** (ORSV and CyMV). Accuracy of test results depends on a number of factors including sample taken, preparation of sample, false negatives and experience of tester. The **sample should come from tissue of the new growth where virus concentration will be highest.** It is necessary to repeat after a month to check if virus concentration increased or was a false negative etc.
- For a grower to say that they have “tested for virus” is both simplistic and naïve. It is **not physically nor financially practical** to test for ALL viruses with their resources.

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Testing and no symptoms

- Many plants may test positive for various viruses and grow vigorously, flower prolifically and show **no visible symptoms at all**.
- This is not a problem unless your cultural and / or management practices **spread** this to other more **susceptible plants** in your collection and / or those of another grower.
- It is safest to **assume that all orchids are virused and practice minimization and management practices.**

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Insect transmitters

- **Chewing and sucking insects** can also mechanically transmit many viruses very effectively when moving from one plant to another with **infected sap.**
- Proven insect transmitters include **thrips**, **aphids** and **mites**. It has been shown pretty dramatically in cut flower nurseries just how fast these can transit a number of viruses.
- Not monitoring and having effective control measures for such insects will allow for rapid spread.

https://www.aranbeemorchids.com.au/hello-orchid-growers-july-2019/

Nurseries / Growers with proven virus knowledge and management

- These sources are now where the **least number of orchids** are purchased. There are still many nurseries and growers that do have **good knowledge and practice virus minimization and management.**

Hybrids

- Orchids produced **from seed** (particularly if the parent plants are virus free) are generally virus free. It is possible for some viruses to be transmitted through a hybrid seed pod, but this is currently not very common. **Hybrids that have been grown on with little dividing in an insect free environment are very low risk.**

https://www.aranbeemorchids.com.au/hello-orchid-growers-july-2019/

The oldest plant in your collection

- The plant that you have had for the **longest period of time** is also the one that has been **repotted, divided, handled the most number of times**. It has also been exposed to the longest period of possible **insect transmission.**

https://www.aranbeemorchids.com.au/hello-orchid-growers-july-2019/

Treatment

- **There is no treatment for a virused plant.**
- **Destroy the plant to prevent it from infecting other plants.**

https://staugorchidsociety.org/culturepests-viruses.htm

Prevention Strictly adhere to good sanitation practices:

- **Use Sterile Cutting Tools** – Viruses are spread by transmitting the plant sap from one plant to another via mechanical means.
- **Controls During Repotting** – Viruses can be spread whenever there is mechanical transmission of sap from an infected plant to another plant, even by leaves rubbing against one another.

https://staugorchidsociety.org/culturepests-viruses.htm

Prevention Strictly adhere to good sanitation practices:

- Disinfect Your Pots Prior to Reuse – Make sure your pots are sterile:
- - Disinfection of Plastic Pots. Plastic pots can be disinfected by first washing them with soap to remove residual organic matter, then soaking them for an hour in a 20% bleach solution, then soaking them for an hour in Physan mixed per label instructions.
- - Disinfection of Clay Pots. Clay pots are porous and cannot be sterilized against viruses by using bleach and Physan alone. Follow the normal disinfection routine for plastic pots above and then bake them in an oven at 400F for two hours to kill any residual virus.

https://staugorchidsociety.org/culturepests-viruses.htm

Prevention Strictly adhere to good sanitation practices:

- **Controls During Routine Activities** – Viruses can be spread whenever there is mechanical transmission of sap from an infected plant to another plant, even by leaves rubbing against one another.
- Observe these additional controls:
  - **Cutting Inflorescences.** Use a sterile tool to cut each inflorescence from the plant.
  - **Removing Inflorescences by Hand.** Don't do it! A virus, if present, can be unknowingly transmitted to your hand and you can infect the next plant when you touch it or remove the next dead flower bud by hand.

https://staugorchidsociety.org/culturepests-viruses.htm

Secateurs

- Use multiple secateurs or cutting implements.
- If you have 3 – 4 pairs of secateurs in the sterilizing solution **use only one pair** on each plant repotting.
- When finished, place it last in the container and begin next plant with a fresh pair.
- Rotating in order secateurs used will ensure that they have been in the solution for the **minimum 5 minutes** to be effective.

https://www.aranbeemorchids.com.au/hello-orchid-growers-july-2019/

There are a number of effective methods of sterilizing potting and handling tools

- 5% sodium triphosphate (**Steri Kleen**) solution
- 10% commercial sodium hypochlorite (**Bleach**) solution
- 2% **sodium hydroxide** solution
- thoroughly flaming with a **propane torch**

- Rod A soaks his 10 minutes in **Mentholated spirits**

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Additional contols

- **- Latex Gloves.** Wear latex gloves when handling a given plant and discard those gloves when you are done handling the plant. Your bare hands can come into contact with plant sap containing the virus and infect the next plant.
- **- Newspaper on the Potting Surface.** Keep the potting surface sterile. Keep a stack of newspapers handy and when repotting, place newspaper under the potting area. Upon completion, wrap up the newspaper, gloves and other detritus and discard them before touching the next plant.

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More controls

- Do not have your orchids **overcrowded and intergrown.**
- **Segregate high-risk plants** from low risk plants and **order potting and handling** according to risk status.
- If you have any suspicion that a plant is affected by virus, then it almost certainly will be. Giving it another go, or placing it in “isolation” is just **prolonging the inevitable** and exposing the rest of your orchids to risk. It is better practice to sacrifice the few, to save the many.

https://www.aranbeemorchids.com.au/hello-orchid-growers-july-2019/

Discussion & Questions

References:

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