PO Box 56022
Vancouver BC
V5L 4V0

Orchiflora

Volume 10, Issue 12
November 2020

Montly General Meetings: 4th Wednesday of each month (except July, August and December)

***We will continue to hold virtual Meetings & culture classes for the foreseeable future.**

***See Evelyn's message for instructions to join our virtual meetings and culture classes.**

*****Culture Class – Tuesday, November 10 – at 6:30 pm*****

INSIDE THIS ISSUE

Presidents message	Pg 2-3
Minutes	Pg 3
Member Photos	Pg 5-14
Wayne's Corner	Pg 15
Virus Testing	Pg 16-22
Disinfecting potting tools	Pg 23-25
Executive and Board	Pg 26
Social Media	Pg 27

Eugene Banziger will present a virtual class on: "The hidden secrets of growing orchids." This culture class should be helpful for both novice and experienced growers.

******Monthly Meeting **Virtual Auction – November 25 at 6:00pm*****

- **6 pm - President's welcome & general information/announcements; See Evelyn's message for information on how to participate in the auction.**

Next scheduled virtual monthly meeting – *January 27, 2021*

*****AOS Judging* - The Western Canada Judging Center (WCJC) meetings are cancelled until further notice****



President's Message

I hope this message finds everyone and their families safe.

Here are some suggestions to keep your orchid safe for the winter.

1. Give your orchids enough light. Home growers try moving them to the sunniest room in your home or the room with the most windows. Remember natural sunlight is best. To avoid sunburn, keep your plant in a north- or east-facing window, away from direct sun exposure. If you are keeping your orchids in a room with south-facing windows, make sure they are out of direct light but still in a spot that receives plenty of sunlight.
2. Watch for drafts whether it is your front door or a window that is letting in too much air, try to keep your orchid away from drafts. If you notice your orchid's buds falling off, there is a good chance you are exposing it to a draft.
3. Keep orchids away from hot air blasts - away from vents and space heaters.
4. Check your orchid's roots to see if they are dry and gray. If that is the case, your plant may need more water. You should also take a close look at your plant's leaves, if they are wrinkled, you can either increase the amount of water you are using or the frequency. When your roots turn green and plump, you will know your plant is healthy. Roots also provide orchid plants with water and nutrients. Some orchids obtain moisture and nutrients from the soil, while others obtain moisture and nutrients primarily from humid air.
5. Increase the humidity. Your orchids love humid environments. You can increase the humidity around your orchid by making a humidity tray. Fill a shallow tray with pebbles and some water, and then place your orchid on top. You can put a humidifier in the room.

For more guidance tune in to our culture class, as we are fortunate to have one of our best growers volunteered to do a presentation. Eugene Banziger's culture class is titled "The hidden secrets of growing orchids." This culture class should be helpful for novice and experienced growers. Thank you, Eugene.

For the November meeting it is time to have a little fun. We are planning to have your annual auction. For those who have plants or other items they want to auction off, please send in a photo of the item to ewnash@live.ca, so we can organize the order of presentations. The host of the Virtual meeting, Andrew, will control the order of the photos for each of the items and will control the order of the speakers. Ingrid has volunteered to record the names of bidders, item's owner, and money amounts, as well as contact info to pay and receive the items. The exchange of item will be left up to the owner and bidder. Everyone needs to have their camera on so we can see who is bidding as well.

There are several ways you can purchase the items from the auction.

1. Sending a cheque to: Vancouver Orchid Society

1690 Nanaimo St.
P.O. Box 56022
Vancouver, B.C. V5L 4V1

2. To pay for your auction plants, an email will be sent to you which will contain a link that lets you make payment digitally. You may use credit or debit cards to pay. See this help article if you want to know more about making a payment from the emailed invoice: https://squareup.com/help/ca/en/article/5138-pay-invoices-with-square

The invoice should come from the address: invoicing@messaging.squareup.com and will look similar to the picture below. Click on "Pay Invoice" to be taken to a secure webpage to enter your payment information.
I hope you will all join us for the fun.

We have upgraded our Cisco Webex plan, joining the monthly meeting must be done by one of the following ways (same process, different details):
Use this new web link: https://vancouverorchidsociety.my.webex.com/meet/vosexecutive
OR
Open the Cisco Webex program and enter this new meeting number 142 001 4949 in the Enter meeting information field, under Join a Meeting.

For either of the above methods, enter a name, email address and click Next. Then make sure you click Join meeting button when ready. If you see this dialog about waiting for the host, then rest assured as you've managed to join the meeting and If you have any questions, please let Andrew know at: vos_secretary@outlook.com. See you soon.
Until then thank you for your support and take care,
Evelyn Nash

Vancouver Orchid Society Monthly Meeting Minutes 28 October 2020 6:30pm

Hosed virtually on Cisco Webex

Culture Class will be hosted virtually on November 10th, the topic of discussion has yet to be decided

Our next monthly meeting will take place on the 25th of November, again hosted by Cisco Webex. We will be having our fundraiser auction, donations are appreciated! Please email picture and a description of auction items to Evelyn Nash ewnash@live.ca

Ingrid will be in charge of recording the winning bidders and winning amounts at the auction. Andrew will be controlling the order of speakers at the auction and presenting the photos of the items. Make sure your camera is on to see who is bidding

Payment for auction items is still to be figured out. Possibilities include etransfer, either to Maureen or perhaps we can figure out etransfer directly to the VOS's email. We also have the option of Square for credit card payments

Delivery/ pick up of auction items it to be figured out between the item donor and the auction winner

Currently our bank balance stands at $8,722.15. We had a singly recent transaction of $130.19 to Storage mart. Projected payables include $241.25 to Cisco Webex and we have yet to be invoiced for our rent to VanDusen for January and February of this year. We also have two term deposits, one of $7,308.25 maturing in March 2021 and one of $10,250.68 maturing in March 2022

No new members were present at the meeting; however, we have had several new members join shortly thereafter

Thanks to Ingrid Pike for presenting at this meeting on some of beautiful orchids native to Honduras!

Conor Preston, Secretary

Wednesday, November 25 – VIRTUAL AUCTION – 6 pm

****Join in for a fun time and the opportunity to bid on some new orchids for your collection as well as other items of interest****

VOS Member Photos

****Until we get back to regular meetings at VanDusen the Newsletter, WhatsApp, Instagram and Facebook will serve as our 'meeting show tables'**

Jim Poole

C. Roebling

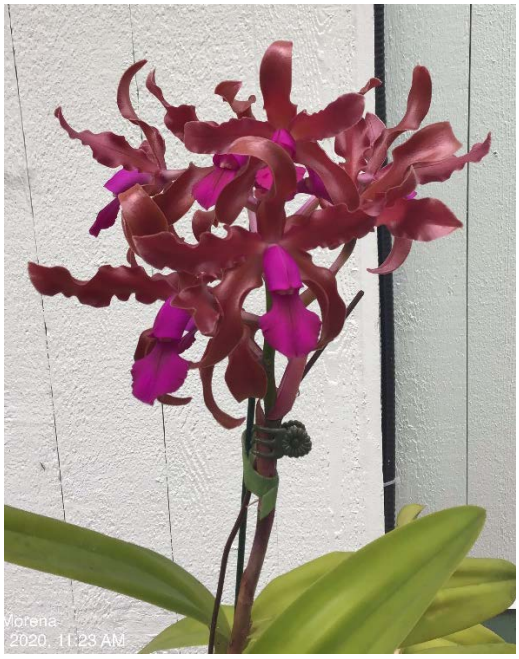
Carla and Bill Bischoff

Phrag. besseae

Trichocentrum cardicum

Marilyn Lew

C. labiata ('do Roberto' x Ipanema)



Lc. Mi Morena

Marilyn Lew

C. maxima coerulea x self

C. Walter Wolf

Daniel Kwok

Sophronitis coccinea

Daniel Kwok

Phal. Purple Martin

Den. Aussie Hi-Lo yellow red

Sasha Kubicek

Paph. henryanum

Sasha Kubicek

Masd. deumana

Bulbophyllum mastersianum

Jennifer Fabre

Laelia alori – 2nd flowering; delicate fragrance

Jennifer Fabre

20+ Paphs in bloom or spike

Eurychone rothschildianum – very fragrant

Jennifer Fabre

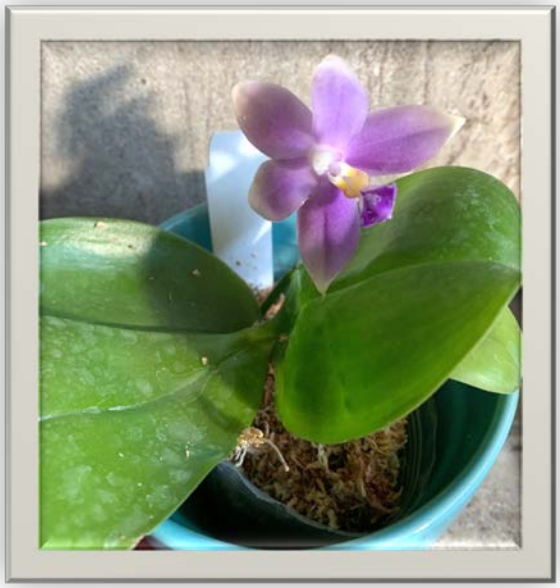
Paph. Helen Congleton

Vivien Chung

Wils. Lisa Devos 'Burgundy'

Vivien Chung

Jewel Orchids: Macodes sanderiana, Dossinia Dominyi Judy, Ludisia discolor

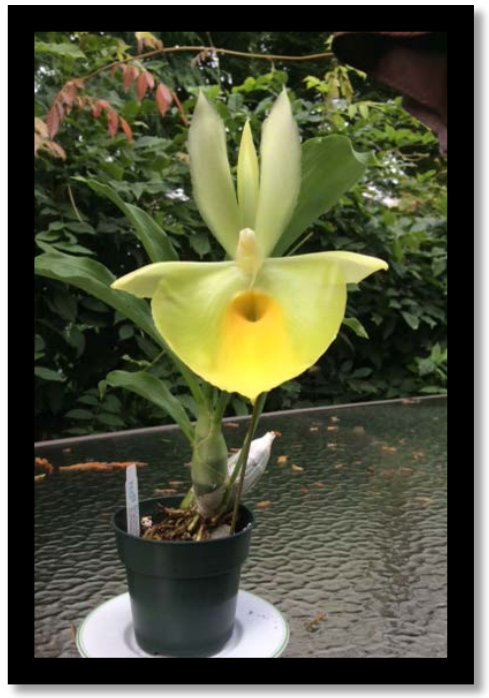


Phal Jennifer Palermo f. coerulea x Phal violacea indigo

Richard Pearson

Stanhopea nigroviolacea; division from Rob Elvidge's large plant

Joan Walton



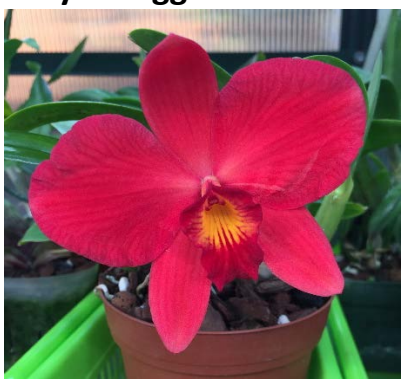
Catesetum pilatum 'Jumbo Green Gold'

Joan Walton

Onc Kaizmic Delight 'Green Stone'

Helcia hibrido

Wayne Riggs



C. Isabelle Stone (sincorana x coccinea)

Maureen Burke & Collis Wilson

V. Greeting Black - Reliable bloomer 1x year. Enjoyed summer outside hanging from a tree branch

Cymbidium Mighty Mouse x Tracey Reddaway bred by Tom Hobbs - Outside until this week. One spike only--too early!

Maureen Burke and Collis Wilson

Phrag. Eric Young x Sorcerer's Apprentice - Outside for the summer, semi-hydro, 5 new growths. Good-size bloom, new bud behind.

Melanie Gallacher

C. Maris Song x Chian Try Regalia Stunner

Eugene Banziger

Acineta Superba

Eugene Banziger

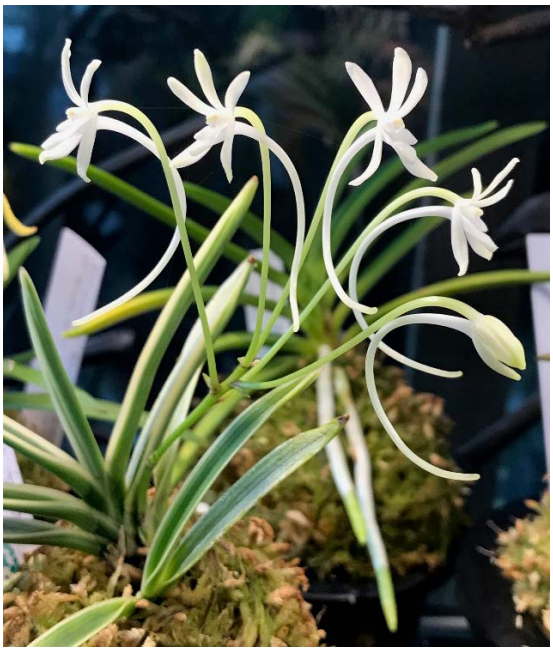
Den. Victoria Reginae

Onc. NOID

Valerie Melanson

Rhynchorides ‘Bangkok Sunset’ – grown under lights

Valerie Melanson

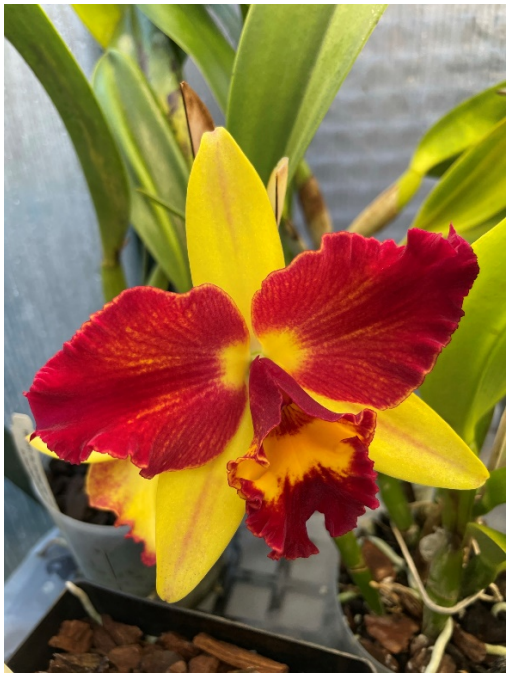


Neofinetia / Vanda falcata 'Gojo Fukurin' – grown under lights

Neofinetia / Vanda falcata 'Kibana' – grown under lights

Wayne Riggs

Slc Fire Magic (Fire Fantasy ‘H&R’ x Lc. Tokyo Magic ’6-1’)



Slc. Fire Magic ‘Solar Flare’ (Lc. Tokyo Magic x Fire Fantasy) – also from H&R

Jennifer Pell

Bulbophyllum annandalei

Phal Princess Kaiulani x Samera f. coerulea

Paph sukhakulii x charlesworthii

Jennifer Pell

Masd veitchiana 'Bural' x norops

C. Siam Jade

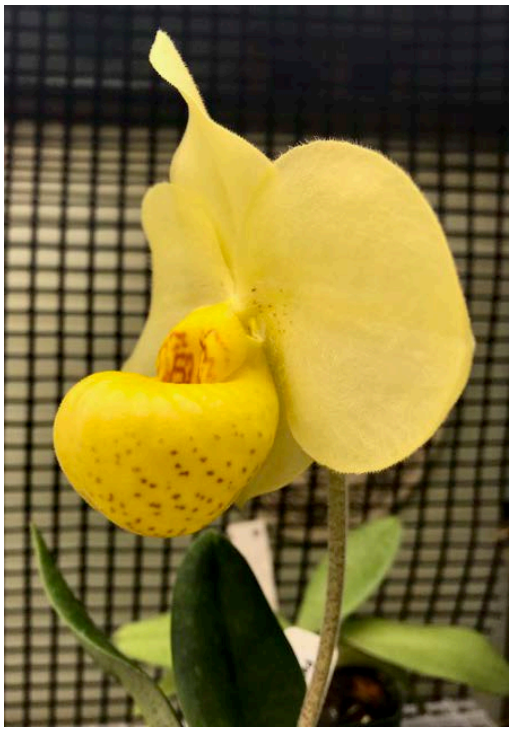
Lori Barrington

Oncidium ornithorynchum

Lori Barrington

Phalaenopsis tetraspis C1

Zootrophion alvaroi



Paphiopedilum Franz Glanz (armeniacum x emersonii)

Thank you to all who sent photos to share with fellow members. Lots of beauties here as well as some new and unusual plants!

Wayne's Corner!

This month I have two special articles for you on orchid viruses. I would like to thank VOS member Lori Barrington for suggesting this topic for our newsletter. Lori had read the first article on the web by Dr. A'na Sa'tara, which describes orchid virus testing she and Paul did for their complete collection. After reading the article and finding it highly informative I wrote to A'na to ask permission to publish in our newsletter. She quickly agreed and went to the extra effort of taking the web-based content, formatting and sending to me as a pdf file. She also sent a second pdf describing how to effectively disinfect your repotting tools. I hope you find these articles of interest and value as they apply to your orchid collection. A'na also sent the following note:

"Outside of California, I have observed limited interest in orchid virus testing, and even some remarkable hostility to it. My appreciation for your effort to bring greater awareness to the growers in your area.

Unfortunately, the orchid virus situation is probably more concerning than most even begin to realize in the US and Canada. I regularly communicate with a Cymbidium grower in Australia, and he always tests for 3 viruses: CymMV, ORSV, and orchid fleck virus (OFV). The latter has been introduced through Asian imports and has become widespread. I do not know of any testing for it in North America. But it is probably here as well, given the volume of orchid imports. A local commercial grower told me that he disposed of 300 orchids last year (mostly seedlings) that were infected with impatiens necrotic spot virus (they import a lot of plants from Taiwan). INSP is spread by thrips. So … all the more reason for strong disinfection practices — guarding against the yet unknown. CymMV and ORSV have been the historically most prevalent viruses, but there have been a lot of changes to horticulture in the past decade."

A'na Sa'tara
aeorchids.com
clearlightimages.com
aeorchids1@gmail.com"

It seems just as we currently have the COVID-19 virus lurking in our human environment, so we have potentially many different viruses set to attack the orchids in our growing spaces.

Virus testing an (entire) orchid collection for CymMV & ORSV: The surprising results at AEO

Negative orchid virus test for CymMV and ORSV using the Agdia, Inc. test kit

Orchid viruses are one of the "known mysteries" in orchid growing and collection. They are widely recognized as a concern; any thorough repotting demo or orchid culture talk implores the audience to take precautions to disinfect cutting tools, pots, and prevent cross-contamination on potting benches. Yet very few people systematically test for viruses in their orchid collections or request a test at purchase. Only recently have virus tests for Cymbidium Mosaic Virus (CymMV) and Odontoglossum Ringspot Virus (ORSV) been required at local orchid society auctions in our area.

While 17 viral pathogens have been confirmed to infect orchids (pers. comm., Janet Lamborn, Agdia, Inc.), it is believed that over 95% of infections are from CymMV and ORSV (pers. comm., Kay Klausing). These are the two "home testable" orchid viruses, and the viruses which I will discuss in our findings.

For this article, I will focus on our results from virus-testing our orchid collection, and the patterns indicated. I will also add my practical suggestions, to hopefully save you time and money in the testing process. (In another article, I describe our process for orchid virus disinfection of repotting tools.)

Note: I am not presenting our orchid virus testing as a scientific study or analysis. We grow mostly species and primary hybrids of a few genera. There is nothing random or representative about our orchid collection; however, the samples of the genera are large enough to point towards some meaningful trends to consider.

Testing our entire collection for CymMV & ORSV

In my inquiries, I have found little information available on how widespread orchid viruses truly are in orchid collections and nurseries. A lack of tangible data can lead to a lot of assumptions and mythology.

I was a participant in some of the assumptions, as I describe below, and assumed a minimal risk for most of my collection. Our findings have inspired me to offer the detailed results, to encourage others to re-evaluate their expectations, and how they wish to approach dealing with orchid viruses in their collections and purchases.

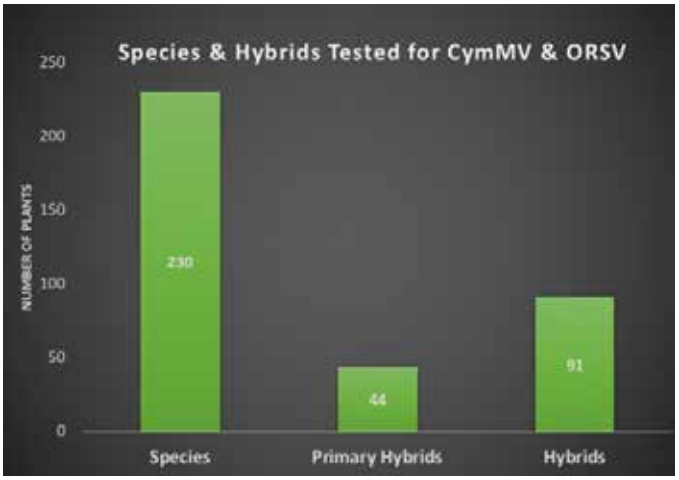
In some respects, orchid viruses are a bit of an "inconvenient truth" that growers and vendors have not widely made the efforts to investigate, expose, and directly address. I've received quite the range of responses when reporting the virus status of an orchid after a purchase. Sometimes denial, sometimes non-response to emails, sometimes a full refund with no questions asked. Before a sale, the messages are also routinely mixed: no testing needed, no symptoms of viruses here, or viruses really aren't that much to be concerned about. And the ubiquitous: "it is too expensive to test my plants."

Recognizing the diversity in attitudes, and frequent lack of transparency regarding virus tests, we decided to take on the time and expense of testing ALL of our blooming and near blooming size orchids to shine the light on or-

AEO
AN ESSENCE OF ORCHIDS
www.aeorchids.com

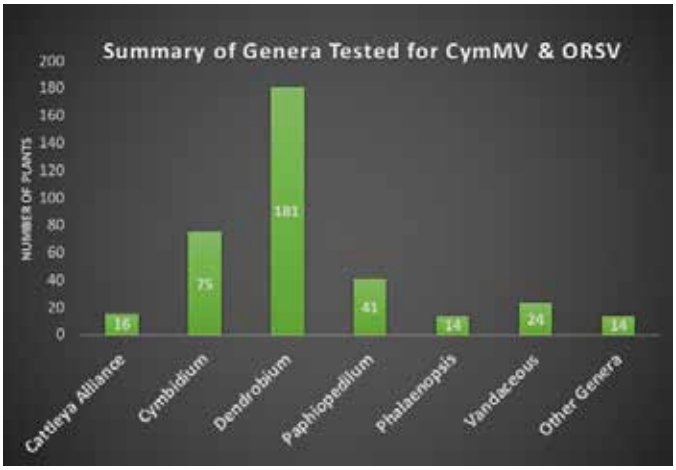
chid viruses effectively "hidden" in our un-tested plants. I also wished to understand the patterns of virus distribution across genera that I collect, and from different vendors, for the future considerations of our collection.

While this is a relatively small sample (365 orchids at the time of these test results), I found it large enough to observe some meaningful patterns. We did not test any seedlings deflasked within this year; they are too small and it would be necessary to use much of the plant for the test.



Graph 1: Summary of the distribution of orchids by type at the time of testing.

Species are the majority of our collection (63%), with primary hybrids (12%) and more complex hybrids making up the remainder (25%) (Graph 1).



Graph 2: Summary of the genera in our collection at the time of testing

Graph 2 summarizes the distribution of genera tested in our collection: *Cattleya Alliance* (4.3%), *Cymbidium* (21%), *Dendrobium* (47%), *Paphiopedilum* (11.2%), *Phalaenopsis* (3.8%), vandaceous genera (6.5%), and other genera not included in the former (3.8%). For reference, of the *Dendrobium*, about half (54%) are Australian *Dendrobium*.

Especial appreciation for the inspiration for our virus testing endeavor is extended to Dr. Kay Klausing, molecular biologist and president of the San Diego Orchid Society. He gave an eye-opening talk on orchid viruses to the San Francisco Orchid Society in October 2018, and shared detailed results of testing his entire 1200 plant collection. While I had already tested our entire *Cymbidium* collection, after his talk, I realized it was time to step up and test the rest.

Starting with *Cymbidium*: Assumptions and expectations about viruses

As noted above, we had long recognized the prevalence of orchid viruses in *Cymbidium*, due to the many decades of plant divisions passing through commercial nurseries en masse without disinfection procedures between orchids. An older grower once commented that he would divide and repot a hundred *Cymbidium* in a day without any hygiene or disinfection between plants. Similarly true for commercial *Cattleya* production. I have heard numerous comments about widespread viruses in "heritage *Cattleya*."

Half (3) of the ORSV positive Cymbidiums in our collection were older cultivars of *Cymbidium lowianum*. The virus-infected primary hybrid was a hybrid of *Cymbidium lowianum* as well. No other *Cymbidium* species (24 plants) or primary hybrids (9) were infected in our collection.

Under these conditions, it is easy to see how viruses could rapidly spread and be prevalent in older *Cymbidium* and *Cattleya* cultivars. *Cymbidium* growers in California have actively recognized this, and were instrumental in the development of the quick, "home" CymMV and ORSV test kits that most of us in the USA currently use for virus testing (Agdia Labs). One well-known California grower has a comprehensive virus policy on their website with offer of pre-testing for sales, and our local *Cymbidium* societies now require virus testing for plants entered into their very popular auctions.

Suffice to say, I had strong awareness of virus concerns for *Cymbidium*, and we tested our entire collection, and have tested every new *Cymbidium*. For the initial testing of our 70 *Cymbidium* plants, we found six plants (8.5%) with ORSV — ALL purchased from one local grower. I describe the details with our other results below.

Our Virus Testing Process

One of the key sources of resistance to virus-testing is the cost of the CymMV/ORSV test kits from Agdia, Inc.; with shipping they are currently about $5.75 per test. While Agdia does NOT make this recommendation in their instructions with the kits, it is possible to test multiple plants with each kit. I have found it highly sensitive at detection, even with small samples, as long as the sample quality is good (enough cellular liquid content and well crushed). When testing multiple plants, I take extra care to crush each plant's sample individually, and then thoroughly mix the buffer solution in the test kit.

My experience is comparable to Kay Klausing's suggestion of six plants per test as optimal. With more plants and sample material, I have found the dilution of the sample in the buffer solution to be too high, and the test takes a long time to process. He noted that some members of his orchid society have successfully cut the test strips in half; I have not tried this.

There is another manufacturer of test kits from Taiwan, Regabio Technology, but they do not have a US distributor. However, the San Diego Orchid Society placed a group order, which resulted in a substantial discount, bringing the tests to about half of the price of the Agdia tests. The Regabio test kits require a smaller sample size than the Agdia tests, and remain shelf stable for 18 months. (Update: in 2019, we switched to Regabio. They sell test kits in boxes of 50. With international shipping and fees, the price per test was $3.80 with the purchase of two boxes.)

We own many thick-leaved Australian *Dendrobium* like this *Dendrobium speciosum var. pedunculatum*. I found using a piece of root less damaging, and more amenable to testing multiple plants, instead of a leaf sample. For one *Dendrobium speciosum* that did not have a "juicy" root outside of the pot, I sampled part of a leaf; it subsequently dropped the entire leaf (and no others). I observed the leaf drop after sampling in a few other *Dendrobium* as well.

I used a new, disposable razor blade to obtain each sample from the plants. While it may vary by genera, I found roots to be excellent for sampling with the Agdia test kits. It was easy to obtain a small piece of root and allowed for more plants to be combined into one test kit with less adverse effect on the dilution factor than leaf material (especially from thick-leaved *Dendrobium*). For the Regabio test kits, I generally use leaf material, but a much smaller sample is required.

There is a caveat for how many plants it is useful to combine into one test. After all, if you get a positive result, then you have to start testing the orchids individually to find the one (or more) with virus. If you have a high virus prevalence in your collection, you could wind up actually using MORE test kits by combining multiple plants into one test than if you just tested each one individually.

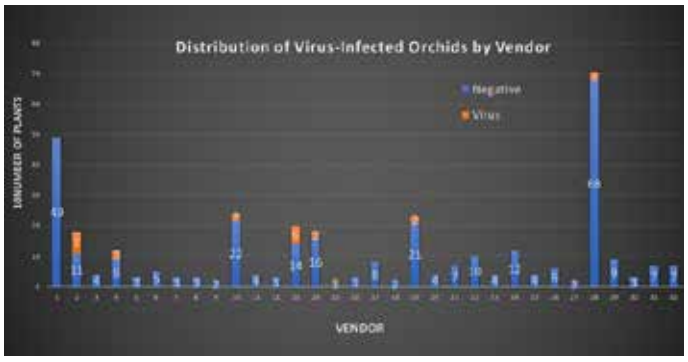
Unfortunately, when you start testing, you have a big unknown: you do not know what percentage of your orchids are infected. However, as you proceed, you may obtain some experience to determine which plants are lower risk, and can be combined into one test with a greater likelihood of negative results. Once I saw the patterns, I started testing "high risk" orchids individually. I determined the "risk" by the age of the cultivar and the source of the plant.

It is hard to say in advance what approach will ultimately work the best for an individual grower, since each collection is so unique. I organized our testing by orchid vendor, since, from my *Cymbidium* testing described above, I had identified the plant source as highly correlated to positive virus test results. In Dr. Klausing's presentation, it was notable that specific vendors also accounted for a large majority of his infected plants. I ultimately found the same.

Results & Discussion

With such a long prelude, the results of several days of work can be summarized fairly succinctly. In total, 6.8% of our collection tested positive for CymMV or ORSV. 11 orchids tested positive for CymMV, eight tested positive for ORSV, and six were positive for both CymMV and ORSV. I elaborate on these results by type, genera, and vendor in the three following graphs.

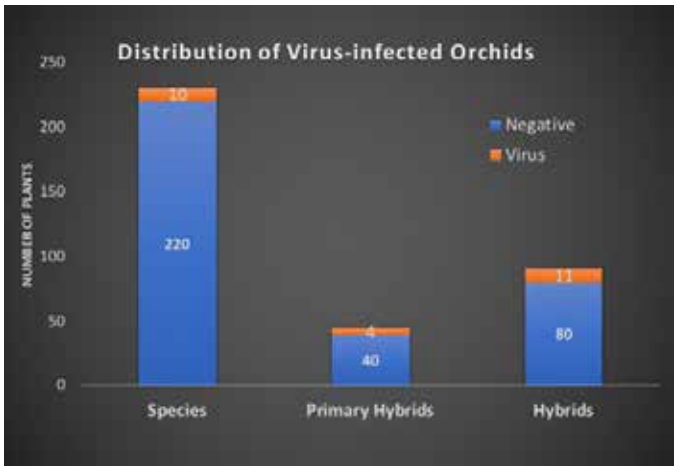
Orchids in our collection were acquired from a total of 41 different sources. However, 10 of these were purchases of only 1 plant and none of these single purchases were infected with virus. I have excluded these vendors from the following graph, and only include sources of 2+ orchids.



Graph 3: Distribution of virus-infected orchids by vendor, including only sources of 2+ plants

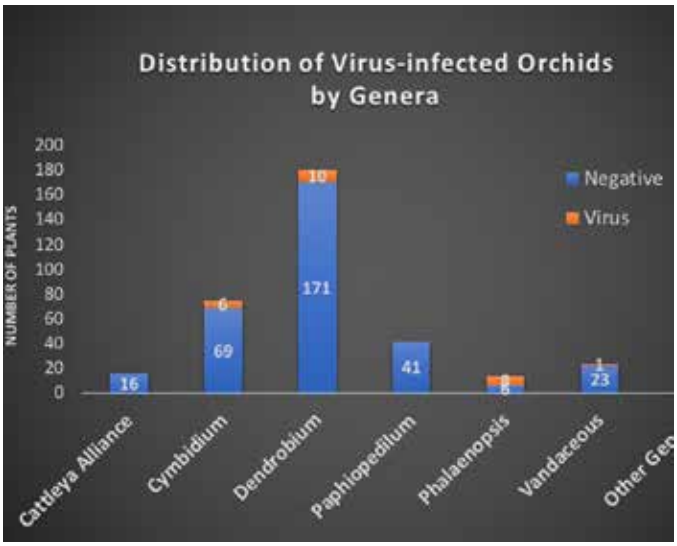
Three local growers accounted for most (67%) of the positive results. To my horror, I determined that 3 of 7 plants that I purchased at ONE nursery open house were infected with CymMV. All were healthy, vigorous orchids with no symptoms of virus, even in hindsight.

My appreciation and recognition of Andy's Orchids, our second largest source of orchids: NO virus positive plants, of the 49 that I have purchased. Kay Klausing also reported no virus-positive orchids from Andy in his collection. Also notable, my largest source of orchids only resulted in 2 of 68 plants to be positive with CymMV (both older divisions/cultivars). Clearly, virus detection, disinfection, and handling practices within greenhouses are signifiant — and effective — for maintaining a virus-free nursery and sale plants.



Graph 4: Distribution of Virus-Infected orchids by species, primary hybrid, and more complex hybrid.

Species orchids were the largest portion of our collection (230), and accounted for the lowest virus incidence (4.3%). Primary hybrids (44) and more complex hybrids (91) were similar in virus incidence, 9% and 12% respectively (Graph 4).



Graph 5: Distribution of orchids testing positive for CymMV and/or ORSV by genera in our collection at the time of testing.

In total, there were six *Cymbidium*, 10 *Dendrobium*, one *Sarcochilus*, and eight *Phalaenopsis* infected with CymMV and/or ORSV (Graph 5). There were no virus infected *Paphiopedilum*, vandaceous, or *Cattleya* Alliance plants. For clarity, we do not own any orchids in

the *Cattleya* genus; our *Cattleya Alliance* plants are all *Leptotes, Epidendrum, Laelia,* and *Rhyncolaelia*. I discuss each infected group below.

A well-known mericlone, *Phalaenopsis stuartiana* 'Sogo', found to be infected with both CymMV and ORSV.

Phalaenopsis

The only indication of cross-infection within our collection was amongst the *Phalaenopsis*. These were complex hybrids that resided at my husband's company for many years, cared for by employees and myself. Disinfection of clippers after cutting flower stalks was minimal to none; when the plants were first acquired many years ago, no one even knew of orchid viruses.

The surprising result with the *Phalaenopsis* collection exposed one of the false assumptions that I had about orchid viruses: mericloned *Phalaenopsis* would be low risk for virus. Apparently, a very incorrect expectation. Seven of eight of the virus-positive *Phalaenopsis* were obtained from the same reputable local orchid nursery (not a grocery or box store), though originally imported from Taiwan. No other orchids that I obtained from that nursery (including *Paphiopedilum*, vandaceous orchids, and *Dendrobium*) were virus positive.

From what I can speculate in hindsight, 2-3 of the *Phalaenopsis* that I initially purchased had virus, two with CymMV and one with ORSV, and subsequently spread it to another four in the office. All were asymptomatic, flowering and growing profusely.

One infected *Phalaenopsis* was a mounted species (mericlone import from Taiwan), and kept separate at our house. I believe it was also likely infected upon purchase, given little to no contact with any of the other infected plants, and my strong disinfection procedures at home.

Cymbidium

As noted above, all of the infected *Cymbidium* came from one local grower and all were infected with ORSV. These included three species, one primary hybrid, and two complex hybrids.

The species and primary hybrid were older clones, and fit the pattern described earlier of being infected in the pre-virus awareness days of orchid culture. However, the complex hybrids were seed-grown at their nursery, strongly indicating transmission within their collection. Fortunately for us, our disinfection procedures prevented any apparent spread.

(I would like to note that it is possible to transmit viruses through flasking orchid seed, if the inside of the seed capsule of a virus-positive orchid is scraped and the virus material is introduced into the media. However, if the seed is shaken from the capsule, and no parent plant material is intermixed with the seed, then the resulting seedlings should be virus free.)

Does this profusely blooming *Sarcochilus hartmannii* look like it has virus? It tested positive for both CymMV and ORSV. All positive tests in our collection were asymptomatic, with the exception of two poorer growers. However, several other less vigorous growers tested negative for virus.

Dendrobium & Sarcochilus

The 10 infected *Dendrobium* came from six different growers, and all were infected only with CymMV.

Older cultivars of *Dendrobium* were the stand-out (60%) amongst the infected *Dendrobium*. Three of the infected *Dendrobium* were divisions from old species plants and three were divisions of old primary hybrids; two of these were originally wild-collected.

Three commercial growers had two infected plants each detected. However, these included the old primary hybrids and species described above, and another older hybrid. I have purchased dozens of non-infected plants (seed grown and divisions) from these same nurseries. It appears that these plants are fairly isolated in their nurseries. With this experience, going forward, I will certainly be very careful in considering purchasing ANY older cultivars or specimens, regardless of the nursery.

One local, commercial vendor had the highest infection rate: 3 of 7 plants purchased at a recent open house. This included two mounted *Dendrobium* species and one *Sarcochilus* species.

The final infected *Dendrobium* was a primary hybrid purchased from a well-established online commercial grower. I have only purchased two orchids from this source.

Reflections on the Virus Testing Process

I can say that it was a rather trying process, watching each test to see if one of my cherished plants would test positive. That being said, I am VERY grateful to have undertaken the time and expense. I feel relief knowing undetected CymMV and ORSV infected orchids will not able to inadvertently infect other orchids in our collection, or be given/sold to another orchid grower. The thought of unknowingly spreading orchid viruses is far worse to me than the cost and effort it took to test our plants.

That being said, our disinfection and handling procedures are even more rigorous now, despite knowing the CymMV and ORSV status of our orchids. We still treat each orchid as potentially virus-infected. Why? Because each plant STILL is potentially infected with an orchid virus. There are other orchid viruses that have not been tested/identified, and always the possibility of a false negative remains. In fact, the Agdia virus test kits were recently updated to be sensitive to a previously undetected Asian strain of CymMV; therefore, we can only be assured of knowing the virus status of a plant for what is currently detectable with the available kits.

What to Do with the Virus Test Results

What to do with orchids that have tested positive for virus is a complex and often emotional question. Orchid growers have very different perspectives about retaining virused orchids in their collections. I do not make a recommendation, or imply a criticism of anyone else, in sharing how we handled our test results.

I personally do not wish to maintain orchids with viruses in my collection and will test all newcomers to ensure that we do not obtain more. A small orchid with virus will become a large orchid with virus — where will the all of the effort in growing ultimately lead? As I commented above, we do not wish to be in a position where we could spread virus to other healthy orchids in our collection, or to someone else's collection. That is antithetical to why we grow orchids.

We disposed of all of the orchids with positive test results with four exceptions.

We decided to keep (for now at least) the two wild-collected *Dendrobium* natural hybrids, a large *Dendrobium linguiformis* specimen, and a very old *Dendrobium* division originating from a royal garden in Asia. We retained these plants because: 1) they had a very low risk of infecting other orchids, and 2) they were irreplaceable, with all known divisions likely also virus-infected.

We considered the risk of spreading infection from these orchids to be low because they are: 1) slow growing and well-contained, 2) reside separately from our other orchids, and 3) are infrequently repotted. When we do need to trim flower stalks, etc., I will only use a disposable razor blade. They will be repotted in a separate location on the property, away from any other orchids. Old pots, media, stakes, etc. will go directly to the garbage.

Final Thoughts

Thank you if you are still reading this long discussion! I hope that the results and my reflections will be useful to you in your orchid growing. I believe that all orchid growers can benefit from greater awareness and transparency regarding the presence of orchid viruses. If there is a down side to testing for orchid viruses, it would be finding out something that we wish was not true, i.e., identifying a virus infected plant.

I reached three key conclusions from the testing of our collection:

- Older cultivars — both species and hybrids — have the highest risk of infection
- Most virus infected plants originated from a small number (3) of local vendors

Some genera have higher infection rates than widely realized (*Phalaenopsis*) and some genera (*Paphiopedilum*) appear to have consistently lower rates of virus infection

With regard to the low rates of infection for *Paphiopedilum*, at a talk by Brandon Tam, the orchid curator at Huntington Gardens in Pasadena, California, he stated that they randomly tested 300 of their 6000+ *Paphiopedilum* and *Phragmipedium* collection. He found one positive result (*Phragmipedium*). Especially in mixed genera collections, the risk of virus infection in *Paphiopedilum* is always there, but seemingly lower than other genera. Possibly this is because Paphs are seed-raised and infrequently divided compared to other genera, such as *Cymbidium* and *Cattleya*, reducing virus exposure over the decades.

Update

I have continued to test every orchid entering our collection (with the exception of newly deflasked seedlings). Over the past two years, I have tested another 150 orchids, and my recent experience has been consistent with the original testing results. I have encountered two positive test results, both divisions of older cultivars. The perspective and awareness that has come from testing well over 500 orchids has significantly influenced our orchid sourcing and acquisition. Now we primarily purchase seedlings, flasks, and select divisions from fully-tested collections.

Best wishes for your orchid growing!

AEO
AN ESSENCE
OF ORCHIDS

www.aeorchids.com

Getting to 100%:

A two step method for orchid virus disinfection (CymMV, ORSV) of repotting tools

The title of this article evokes a key, but often missed question: how effective is your process for disinfecting your cutting tools for orchid viruses? We have used bleach, flaming, and Physan 20 for years, and I assumed that they were completely effective in removing virus particles from our shears, Exacto blades, pots, and working surfaces. A great expectation that I have come to realize was probably very inaccurate.

Research on Common Orchid Virus Disinfection Methods

In a talk at the San Francisco Orchid Society, Dr. Kay Klausing, a molecular biologist and orchid grower, reviewed scientific studies of the common disinfection methods for orchid viruses, specifically Cymbidium Mosaic Virus (CymMV) and Odontoglossum Ringspot Virus (ORSV). The research examined numerous common approaches, including flaming tools, and soaking in saturated TSP, diluted NaOH (lye), Physan 20, and isopropanol.

aEO
AN ESSENCE
OF ORCHIDS

www.aeorchids.com

Stunningly, none of these were found to be 100% effective for the inactivation of orchid viruses; most were in the 90-99% range, with Physan 20 and isopropanol being largely ineffective. One factor was contact time; in the research, all were assumed to be less ten minutes. No contact time for flaming was provided, and there are wide range of approaches, from heating metal cutting surfaces red hot to casually passing blades through a flame.

While it would be excellent to have a more detailed study, these findings were certainly sufficient to have us rethink our orchid virus disinfection protocols. Although it is possible to debate the details of each method, it certainly appeared that we were only in the 90-99% range for orchid virus disinfection. For our orchid growing, that's not good enough! I'd like my cutting tools to be 100% free of orchid viruses when I work on any plant. We take orchid viruses very seriously and have tested our entire collection for CymMV and ORSV; learn more in this article.

The Unique Resistance of Orchid Viruses to Disinfection

Orchid viruses are exceptionally tenacious at persisting in the environment, and as a result, extra effort is required to reach 100% deactivation of ALL virus particles.

Initially, I was interested in the possibility of using ultraviolet (UV) light as part of our orchid virus disinfection (and general sanitation) protocol. It is widely used in laboratories, ambulances, and spa/medical sterilization. With a little investigation, I realized the unique nature of plant viruses compared to common human pathogens. A table of UV irradiation dosages has been compiled for several dozen common pathogens.

For reference, the UV irradiation dosage to reach 99% disinfection of common bacteria is 3,500-22,000 µWs/cm^2. Anthrax spores were a notable high of 46,200 µWs/cm^2. Influenza and polio virus requires a UV dosage of 6,600 µWs/cm^2 for 99% elimination.

Included on the list is Tobacco Mosaic Virus (TMV). ORSV is part of the TMV family of viruses. We can draw similar assumptions for the closely related ORSV. Remarkably, TMV requires a dosage of 440,000

Two step procedure for orchid virus disinfection of cutting and repotting tools with NaOH and Virkon S

$\mu Ws/cm^2$ for 99% disinfection – nearly 10x that of anthrax spores and 100x that of common bacteria. The only pathogens with a comparable level of required UV dosage were a few types of mold, including *Aspergillus niger* and *Risopus nigricans*.

(Despite the inclusion of "mosaic" in the name, CymMV is in a different family of virus – Alphaflexiviridae, including the genus of *Potexvirus*. ORSV is in the family of Virgaviridae and one of the *Tobamovirus*.)

Suffice to say, the requirements for disinfection of orchid viruses are in a league of their own, far greater than for any other pathogens that we might commonly encounter in our home and work environments.

Getting to 100% Disinfection of Orchid Viruses

Based upon the available research, Dr. Klausing recommended a two step process for 100% orchid virus disinfection of tools. The first step is "cleaning" at elevated pH and the second step involves oxidation of the virus RNA.

NaOH for orchid virus disinfection: step 1

For the first step, he suggests using full strength bleach at elevated pH, saturated TSP, or 1M (one molar) NaOH. For the second step, he recommend using bleach at its natural (off-the-shelf) pH or a disinfectant called Virkon S. In his protocol, he sprays his tools with 1M NaOH and Virkon S, and allows them to hang on a rack for each stage for a minimum of five minutes, alternating with a water rinse between stages.

Many of our orchids are indoors, and spraying lye or bleach around our bathroom isn't very practical. We also often do a lot of orchid mounting and repotting in the evenings, on our "indoor potting bench," a.k.a. a spare table with a bright overhead light. So we needed a way to be able to expediently disinfect our tools in the house.

My solution? I purchased a deep plastic wash basin and six 500ml glass beakers (see top photo). Instead of spraying, I soak the shears in the beakers of NaOH and Virkon S.

First, I wash the shears to remove any particulate matter; I usually spray/scrub as needed with Physan 2o in the sink. Second, I soak the shears in 1M NaOH, for five minutes (or more). A one molar solution of NaOH is produced by dissolving NaOH (lye) granules at a concentration of 40g/L. 300mL of solution adequately covers my shears. I purchased a one pound bag of food-grade lye and weigh the appropriate quantity with a small kitchen scale.

Next, I rinse the shears in the sink. They are then immersed in a 2% solution of Virkon S disinfectant for another five minutes.

Virkon S for orchid virus disinfection: step 2

Virkon S is widely used in agriculture and veterinary applications, and available in small to enormous quantities (think washing down a dairy operation). The more you buy, the cheaper it gets. However, you can buy a small container of pre-measured tablets for about $20, which lasts me for about 6-8 months. One tablet in 250mL of water produces a 2% solution. The solution lasts about

NaOH for orchid virus disinfection: step 1

Virkon S for orchid virus disinfection: step 2

7-10 days, fading from bright yellow. I replace the solution weekly, and always before a large repotting project.

Finally, I rinse the shears again, and place them in an empty beaker to dry. Unlike flaming, I have not noticed any degradation of the blade or rusting from the NaOH and Virkon S disinfection process.

We have at least seven shears, so there is always a clean pair available while others are soaking after use.

There you have it! With one order to Amazon.com for the deep dish basin, beakers, and NaOH, plus the (cheaper) purchase of the Virkon S bottle from an online agriculture supply company, I assembled a 100% orchid virus disinfection station for our cutting tools. Of course, you can use any basin or glass bottles for this purpose. I chose the beakers since they had pre-measured lines for the amount of water to add for the NaOH and Virkon S solutions, and they were the right height for our shears.

Conclusions

I hope that this short review of orchid virus disinfection, and the convenient – and effective – process that we use will assist you in upgrading your virus disinfection methods. While most orchid growers are focused on the widely recognized CymMV and ORSV, there are at least 17 different viral pathogens known to infect orchids. Also, a good orchid virus disinfection procedure should minimize or eliminate the transmission of other orchid pathogens, such as bacteria and fungus.

There is nothing to lose and much to gain from 100% effective virus disinfection practices!

Happy growing,
A'na Sa'tara, *D.Phil*

Preventing Spread of Orchid Viruses when Repotting

To create a clean surface for each plant when we repot our orchids, we use a 2" deep plastic tray lined with heavy duty butcher (freezer) paper. A bulk roll is inexpensive, and my husband pre-cuts the sheets with a paper cutter so we just quickly pull a new sheet for each plant while working. The butcher paper is very durable and resistant to water, with one side having a waxy coating. We often rinse orchids when repotting and I find that newspaper soaks through layers, becoming inky and potentially distributing pathogens through quite a stack of paper. It is easy to roll up a pile of bark in the (strong) butcher paper, even from a 1-2 gallon *Cymbidium* pot, and dump it into the compost bin fully wrapped up and contained.

I do not stack the sheets of butcher paper, but place a new sheet on the bench/tray after the used sheet has been removed. This way, it is assuredly a clean surface for the next plant, a separate layer over the surface of potting bench (or potting tray when indoors).

We disinfect the surface of the outdoor potting bench and indoor plastic tray with 100% bleach, after washing away any particulate matter. Our outdoor potting bench is homemade with a galvanized wire mesh top on a wood frame – no problems with using water and bleach to thoroughly disinfect the metal mesh at least after each day of use, or, if necessary, after handling a diseased orchid.

We soak our plastic pots in a 30% bleach solution for 3 days, after thoroughly removing any organic matter (brush/scrub with soap and water). While the one step process for using bleach to disinfect cutting tools was found to be less than 100% effective for eliminating viruses, allowing the pots to soak for an extended period of time compensates.

Note:

Contributions and tips for the newsletter that would be useful for all VOS members are welcomed. If you wish write a short culture note or pass along some 'secret' growing tips that you find makes your orchids thrive and bloom well please send them along to me so I can include them in a future newsletter (wayne.riggs66@gmail.com). With our new copyright laws one can no longer copy or append an article from the AOS website for example, or many other sources, without specific permission of the author or publisher. This makes it more difficult to add items of general interest to the newsletters.

Executive and Board of Directors President – Evelyn Nash 1st Vice President – Barbara Cable 2nd Vice President – Ingrid Pike Treasurer – Maureen Burke and Erik Nilsen (Co-Treasurers) Secretary – Conor Preston Directors: - Eugene Banziger - Gabrielle Carson - Giulia Comin - Grant Rampton - Keith Willet - Andrew Wong	**Contributions of photos or articles to the newsletter are welcome.** Send to Wayne Riggs: wayne.riggs66@gmail.com The submission deadline is the 8th of each month. Items received after this date will appear in the next newsletter.

Social Media:

Instagram - VOS member Conor Preston has established an Instagram account to generate public interest in growing orchids. Please visit:
https://www.instagram.com/vancouverorchidsociety/
If you would like to post photos of your flowering orchids, please get in touch with Conor at: conorpreston88@gmail.com

WhatsApp – VOS chatroom - Daniel Kwok has established Chatrooms for VOS members to post photos of their orchids, ask questions about plant health or growing tips. It is a great forum to learn from others and to share your plant photos and growing conditions.

We would like to encourage new VOS members, and current members who have not joined the VOS chatroom, to get in touch with Daniel at: dkwok3580@gmail.com (Tel: 604 805-3866) to be added.

Facebook-You can also follow us on Facebook:https://www.facebook.com/VancouverOrchidSociety/

Facebook/Instagram - Photos of your orchids needed

Photos of your flowering orchids (and very basic information on growing conditions) are needed for the VOS Facebook Page and Instagram. This is a great way to promote our love of orchids to other growers and the public. Send your photos to Jennifer Pell/Conor Preston at: VOS_secretary@outlook.com