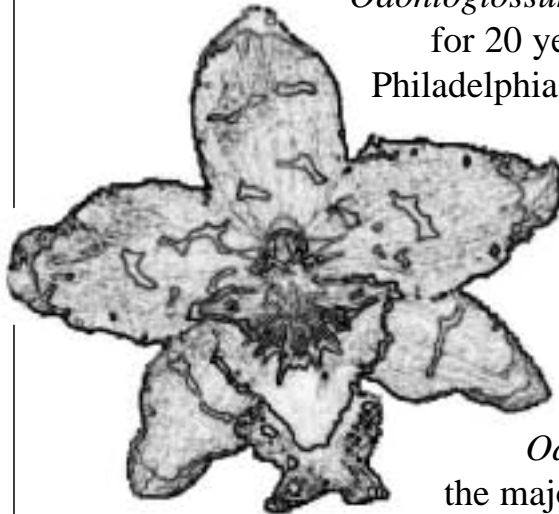


INVITED SPEAKER: PAUL SHEETZ OF JUSTPAT ORCHIDS

The Central New York Orchid Society is fortunate to have a guest speaker for our upcoming meeting this Sunday, November 5, at 2:00<sup>PM</sup> at St. Augustine's Church in Baldwinsville. **Paul Sheetz**, an accredited AOS judge, will be giving a presentation on Wilsonaras, a group of *Odontoglossum*-like hybrids. Paul has been growing orchids for 20 years. He has been vice-president of the Greater Philadelphia Orchid Society (GPOS) since 1986 and is also Show-Table Judging chair of GPOS and Southeastern Pennsylvania Orchid Society (SEPOS).



The topic for the November meeting is "*Wilsonara Hybrids.*" Wilsonaras are that man-made genus of *Oncidium*, *Odontoglossum* and *Cochlioda*. Paul will review the major species in their backgrounds and explore the genus by the *Oncidium* parent and grandparents.

Paul's first love(s) are *Paphs* and *Phrags*, or "Cyps" as W.W.Wilson might call them. But he has a varied collection of many genera. He has even been known

to grow a few succulents with a caudex (bulbous base). Paul is also the owner of **JustPat Orchids** in Philadelphia and has been selling orchids and unusual caudiciform plants, as well as yellow and variegated clivias, at the Philadelphia Flower Show for the last five years. He has exhibited at the SEPOS Show for the last 15 years and exhibited at the Southern Tier Orchid Show this past year. **Paul will have a mixed variety of orchids for sale at our meeting.**

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Once again, the *Central New York Orchid Society* has pulled off a successful fall show, despite the fact that it was smaller than in past years. Every year our show manages to garner a few national awards, and this year was no exception; three national awards were given out, two of which were to CNYOS members! Member Dianne Bordoni's *Pteroceras teretifolia* 'Chrislin' received a CBR (Certificate of Botanical Recognition), and Gary Stensland's work in miniatures was honored with an AOS Artistic Certificate. Photographs of both of these are show on page 5. Both Joe Kunisch of Bloomfield Orchids and MaryCarol Frier of Frier's Orchids returned as our vendors, and enhanced the show with attractive displays of orchids. CNYOS extends it thanks to Joe and MaryCarol for their participation. Joe's *Paph. tonsum v. curtisifolium* 'Bloomfield Emerald' was recognized with the third AOS award, a CHM (Certificate of Horticultural Merit, see page 8 for a photo). Several special awards were given, including the Marjorie Ummer Award for the best hybrid *Cattleya* grown by an amateur, and the Jim Rice Memorial Award for best species, also grown by an amateur. The Marjorie Ummer award was given to Leon Frank of the Southern Tier Orchid Society for his beautiful specimen Lc. Angel Heart 'Sweet Memory' HCC/AOS (page 8). The first annual Jim Rice Memorial Award was given to Bob Wyman of the Genesee Region Orchid Society for his exceptionally grown *Brassavola nodosa* (page 8). This is especially fitting because Jim sold many plants of this wonderful species from his greenhouse over the years.

As usual, CNYOS owes a great deal of thanks to all the members who donated their time and effort to make the show run smoothly. Special thanks go out to Elinor Burton, Dolores Capella, and Iris Cohen for all of their help. A list of awards won by our members appears below. The special awards are listed on page 3.

<u>EXHIBITOR</u>	<u>ENTRY</u>	<u>AWARD</u>
Dolores Capella	Exhibit	First
Dolores Capella	Blc. (Waikiki Gold x Blc. Fringe Benefits)	Second
Dolores Capella	Cycd. Wine Delight 'JEM', FCC/AOS (Cyc. <i>lehmanni</i> x <i>Morm. sinuata</i> )	First
Dianne Bordoni	Ascda. Summer Delight 'Susan' (V. Josephine van Brero x Elieen Beauty)	Third
Dianne Bordoni	<i>Pteroceras teretifolia</i>	Third, CBR/AOS
Dianne Bordoni	<i>Dor. pulcherrima</i>	Second
Dianne Bordoni	<i>Phal.</i> (Golden Peoker x <i>Phal.</i> Baile De Gala)	Second
Dianne Bordoni	Owsr. Joyce Owens (Ren. Brookie Chandler x Dtps. Memoria James McPherson)	Third
Dianne Bordoni	<i>Phal.</i> Rainbow Chip ( <i>equestris</i> x Cassandra)	Second
Donna Coleman	<i>Phrag.</i> Living Fire (Sorcerer's Apprentice x <i>besseae</i> )	Second
Donna Coleman	<i>Onc. crista-galli</i>	Second
Jennifer Wilson	<i>Paph. chamberlainianum</i>	First
Monica Kot	<i>Gga. galeata</i>	Third
CNYOS	Exhibit	Second
David Ditz	Lc. Mari Reyes (C. Sophia Martin x Wailea)	Third
David Ditz	<i>Paph. primulinum</i>	Second
David Ditz	<i>Paph.</i> Maudiae ( <i>callosum</i> x <i>lawrenceanum</i> )	First
Judi Witkin	<i>Phrag.</i> Silver Eagle ( <i>czerwiakowianum</i> x <i>schlimii</i> )	Third
Elinor Burton	C. Hawaiian Comfort (Bob Betts x <i>walkeriana</i> )	Third
Elinor Burton	Bc. Binosa (C. <i>bicolor</i> x B. <i>nodosa</i> )	Second
Elinor Burton	Pot. Hoku Gem (Slc. Tangerine Jewel x Bl. Richard Muller)	Third
Elinor Burton	<i>Phal.</i> Timothy Christopher ( <i>amabilis</i> x Cassandra)	First
Elinor Burton	<i>Phal.</i> (Double Delight x <i>equestris</i> )	Third
Gary Stensland	"Potting Day"	First, Best in Section, AOS Artistic Certificate
Jeff Stuart	<i>L. rubescens</i> fma. alba	Third

**SPECIAL AWARDS**

<u>EXHIBITOR</u>	<u>ENTRY</u>	<u>AWARD</u>
GROS	Exhibit	First, AOS Show Trophy
Bob Wyman	<i>B. nodosa</i>	First, Jim Rice Species Award, Best Species
Bob Wyman	<i>Onc.</i> Gower Ramsey	First, Best in Section
David Clemens	<i>Den.</i> Jaquelyn Thomas x Muang Thai	First, Best in Section
Paul Crumb	<i>Tblm.</i> <i>kotoense</i>	First, Best in Group
Leon Frank	Lc. Angel Heart 'Sweet Memory', HCC/AOS	Second, Margery Ummer Award
Bloomfield Orchids	<i>Phal.</i> Golden Peoker	First, Best in Section
Bloomfield Orchids	<i>Paph.</i> Frank Hughes 'Tanya', AM/AOS	First, Best Hybrid in Show
Bloomfield Orchids	<i>Paph. tonsum v. curtisifolium</i> 'Bloomfield Emerald'	First, CHM/AOS
Gary Stensland	"Potting Day"	First, Best in Section, AOS Artistic Certificate

**IMPORTANT!!! Dues Soon Due!**

Over the next few months, CNYOS will be looking for your annual membership dues (due each December). Check the label on this newsletter: if it reads "C" you are a Courtesy mailing. If it reads "M2K," you are a paid member and owe dues for the new season. "M01" reflects a paid status. "CM" denotes a Commercial mailing. These labels may not be entirely up to date, so if you've already paid, your status will be updated by the next newsletter. If, however, you are currently receiving this newsletter as a courtesy and haven't joined the club, you will be removed from our mailing list in December, especially if you have been receiving the newsletter for more than 6 months and have not yet joined. A few exceptions will be made, including commercial vendors and representatives of various gardening organizations. Annual club dues are \$15.00 per person or \$17.00 per family, payable to CNYOS. Dues should be mailed to CNYOS Treasurer Elinor Burton, at 301 Sherbrooke Rd., Manlius NY 13104.

**CNYOS CALENDAR**

- November 5** Monthly Meeting: Invited Speaker: Paul Sheetz of JustPat Orchids speaking on Wilsonaras.
- December 3** Annual Holiday Dinner, to be held at Pier 57 (Rt. 57, Liverpool). The dinner will be buffet style for \$12.95. We need a minimum of 30 people; please be prepared to make your decision to attend at the November 5 meeting. If you can't attend the meeting, please let Deb Coyle (445-9106) or Dave Ditz (635-8148) know if you'll be attending the dinner.

**GROS NEWS: NEWS FROM THE GENESEE REGION ORCHID SOCIETY**

The next meeting will be the GROS annual auction! There will be hundreds of plants to bid upon, lots of delectable things to munch on, and great deals to be had by all!

Taken with permission from *The Orchid Collection*, Newsletter of the Genesee Region Orchid Society, Vol. 22, No. 10 June 2000, Phil Matt, Newsletter Editor (716) 288-7025.

**STOS NEWS: NEWS FROM THE SOUTHERN TIER ORCHID SOCIETY**

The November 19 meeting the speaker will be John Sullivan talking on his experiences with growing orchids under lights.

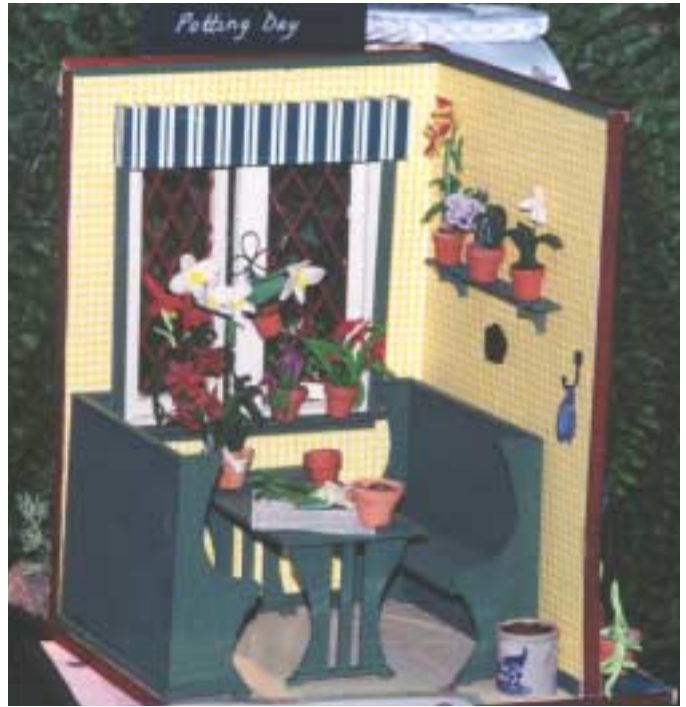
Monthly meetings begin at 2:00 PM in the Vestal Public Library. For directions, etc. call STOS president Dave Clemens at 570-879-4244 or e-mail him at <clemens@epix.net>.

**DECEMBER 3: CNYOS ANNUAL HOLIDAY DINNER**

**CNYOS NEEDS TO KNOW BY THE NOVEMBER MEETING** whether you plan to attend our annual holiday dinner on December 3<sup>RD</sup> at Pier 57 on Rt. 57 in Liverpool. The dinner will be buffet style, with main dish choices consisting of roast beef, baked haddock, rosemary roasted chicken, roasted potatoes, baked ziti, chef salad, bread, and coffee-tea-soda. A bar will be available. The approximate cost will be \$16 per person, with an additional charge for desert. We need a minimum of 30 people to attend. If we cannot reach that number, we will probably arrange for a covered dish dinner to be held the same evening. **Be prepared to pay in advance at the November meeting. Please contact Deb Coyle ASAP if you plan on attending (445-9106).**

**OCTOBER SHOW TABLE**

<b>Cypripedium Alliance</b>		<p><i>Pteroceras teretifolia</i> Bordoni  <i>Ownsa. Joyce Owens (Ren. Brookie Chandler x Dtps. Memoria James Mcpherson)</i> “  <i>Phal. pulchra</i> Weller  <i>Neost. Lou Sneary (Neof. falcata x Rhy. coelestis)</i> Kot</p>
<p><i>Paph. charlesworthii</i> Witkin  <i>Phrag. Silver Eagle (czerwiakowianum x schlimii)</i> “  <i>Phrag. Ecu-a-bess (besseae x ecuadorensis)</i> Capella  <i>Phrag. ecuadorensis</i> “  <i>Phrag. Living Fire (Sorcerer’s Apprentice x besseae)</i> Coleman</p>	<b>Oncidium Alliance</b>	
<b>Cattleya Alliance</b>		<p><i>Ornithophora radicans</i> Kot  <i>Onc. Mendenhall (Butterfly x Psychopsis papilio)</i> “</p>
<p><i>Lc. Niña Bonita (L. albida x C. Claesiana)</i> Capella  <i>C. Caudebec (Sophia Martin x Penny Kuroda)</i> “  <i>Rhyncholaelia digbyana</i> Ditz  <i>C. walkeriana x C. Mini Reef</i> Witkin</p>	<b>Miscellaneous</b>	
<b>Vandaceous</b>		<p><i>Stereochilus bicuspidatus</i> Capella</p>
<p><i>Haraëlla retrocalla</i> Coleman</p>	<p>Iris Cohen</p>	



**CNYOS AOS Winners!**

Above (two views): **“Potting Day,”** by Gary Stensland (miniature to scale, approximate vertical height 8”). Awarded an AOS Artistic Certificate.

Below: ***Pteroceras teretifolia* ‘Chrislin’** CBR/AOS, grown and flowered by Dianne Bordoni.





## MISCELLANEOUS BUSINESS...

### **CLUB REMINDERS**

**Orchid-Growing Supplies** are now available, including fir bark, sphagnum, sponge rock, charcoal, and 40W fluorescent tubes. Call Rich Groll for details on pricing and availability.

The **CNYOS Club Library** is now located at St. Augustine's church. Make arrangements with Dianne Bordoni if you want to borrow an item from the Library.

***DON'T FORGET TO BRING YOUR BLOOMING ORCHIDS FOR THE MONTHLY SHOW TABLE!!!***



*Phalaenopsis bellina* (violacea), photograph by Vagisha Sharma, with digital enhancement by J. Stuart.

### **REFRESHMENT SCHEDULE**

<b>November 5</b>	<b>Monica Kot &amp; Donna Coleman</b>
<b>January 2001</b>	<b>Gary Stensland &amp; Judi Witkin</b>

This is the third and last in a series of articles on Orchid nomenclature. The author is **Eric Christenson**, whom the CNYOS hopes to have as an invited speaker in January.

#### **How to Read an Orchid Label**

##### **The Beginning – Scientific Names**

Taxonomists give all organisms a standard two-part name called a binomial (literally “two names”). This consists of a genus name followed by a species name. Scientific names are always in Latin or in a latinized form and in print are recognizable because they appear in italics. With few exceptions, other horticultural names (hybrids and clones) are not latinized and thus are printed in non-italic type faces.

Genus names are somewhat comparable to a clan name in people – different *Vanda* orchids (or orchids of the genus *Vanda*) are like members of the Joneses while different *Phalaenopsis* orchids are like members of the

Smiths. Species names are not quite comparable but are similar to people's first names. A loose analogy would be that plants of the blue *Vanda coerulea* from the Himalayas are like all the people named Jane Jones while the plants of *Vanda sanderiana* from the Philippines are like all the people named Bob Jones; Bob and Jane would be two different species in the genus *Jones*.

In addition to standard two-part names, orchids are sometimes further categorized with the term “variety,” which may be applied in either a botanical or horticultural sense. Briefly defined, a botanical variety designates a distinctive phase that does not have a separate geographic range. Varieties often represent single genetic differences that occur as a normal percentage of the population. Thus, if most individuals of a species have yellow fruit, but a sizeable proportion have red fruit, the red fruited plants might be called “variety *rubrocarpa*” (literally “red fruit”). Botanists use the term “variety” in a

precise manner. A source of confusion is the somewhat different, multiple definitions of “variety” used in horticulture. A horticultural variety often can mean: (1) the same as botanical variety or (2) a choice individual [in modern usage, a clone or cultivar]. Thus, *Encyclia cordigera* var. *randii* is a frequent white-lipped phase of the species and the use of variety is equivalent for botanical and horticultural names. The wholly white flowered plants of the same species are called *Encyclia cordigera* var. *alba*, applying a horticultural usage of variety. Botanists would call the rare pure white mutation a form, not a variety.

In the past, select individual plants were called varieties, usually in conjunction with an estate or a grower's name. Thus, one of the select plants of *Dendrobium nobile* is called *D. nobile* ‘Sander's Variety.’ This historic horticultural variety would today be treated as a cultivar or clone (more on clones later). Taxonomists use three concepts to subdivide species, designating

nating them as “subspecies,” “varieties,” and “forms.” In the species orchids, taxonomists are rarely at a level of understanding to effectively argue for subspecies *versus* variety *versus* form. In practice, most subspecies, varieties, and forms are lumped together as a variety, in either a botanical or horticultural sense. The important thing to remember is that there may be a difference between a variety that designates a population botanically and sometimes horticulturally and a strictly horticultural variety that applies to an individual plant.

**What is a Clone?**

What do we mean when we mention an orchid clone? The word clone refers to all the plants that are genetically identical. The word cultivar can be used interchangeably with clone. When you go to buy apples, for example, you see bins labeled “Granny Smith,” “Red Delicious,” “Macintosh,” etc. Each of these apples is a clone – all “Granny Smith” apples are produced from grafted trees that originated from one select apple tree. The nearest human analogy to a clone would be identical twins; the two individuals represent one clone.

In horticulture, clones are important. There are several ways that a clone can be designated but the most common method is to put the clonal name into single quotations. Thus, *Phalaenopsis schilleriana* ‘Selby’ is one select clone of this popular Philippine species. *Phalaenopsis schilleriana* ‘Marie’, for example, is another select clone of the species. Clonal names, never latinized, range from institutional designations (‘Mont Milais’ is the clonal name used by the Eric Young Orchid Foundation on the Isle of Jersey, for example) to superlative adjectives (everything from ‘Dazzler’ to ‘Magnificent Watermelon Gold’) to flights of fancy (one particular pleurothallid orchid has a clonal name of ‘Gorgeous Goobers’).

**What is a Hybrid?**

In orchids, as in most plant groups, there are many plants being grown – other than wild-occurring species and select clones of those species. There are also man-made creations called hybrids. A hybrid means the plants

that result from crossing two or more different species; taking pollen from one species and using it to make hybrid with a second species. The best example of a hybrid is the common mule which results from the crossing of a horse with a donkey; mules are famous for being sterile. One of the most dynamic aspects of orchid growing is that orchids can be hybridized freely with little loss in fertility. Plant breeders’ only limitations are time, imagination, and growing space. How do we designate hybrids? A standardized plant breeding notation has been developed. The seed bearing parent (“mom”) is listed first and followed by the pollen bearing parent (“dad”). An “x” separates the two parental names. So, a nice miniature *Phalaenopsis* hybrid can be made by using the pollen of *Phal. equestris* to pollinate a flower of *Phal. stuartiana*. This would be written as: *Phal. stuartiana* x *Phal. equestris*. In this case, when both parents are members of the same genus, the cross would be written as: *Phal. (stuartiana* x *equestris)*. All that this designates is the parentage of a particular group of seedlings. If one were to flower a number of these seedlings and selected an especially attractive plant (or clone), it would be written as: *Phal. (stuartiana* x *equestris)* ‘Selby’. The names in parentheses refer to the parentage while the clonal name ‘Selby’ designates one particular seedling of great promise. In the 19<sup>th</sup> century, it was obvious that with many people making orchid hybrids, some method was needed to keep track of hybrid parentages. At first, prominent breeders maintained and published private “Stud Books.” These were critical for preserving early hybrid combinations but none were comprehensive. To preserve the breeding histories and stabilize the names in use, the horticultural firm of Sanders and Sons in St. Albans, England, began a formal registration process in 1895 which resulted in the standard reference books “Sanders’ List of Orchid Hybrids.” In 1960, this duty was assumed by the Royal Horticultural Society in London. Their Orchid Registrar remains the internationally accepted authority for hybrid orchid registration. Monthly registrations, later reissued in book form, are published in Britain’s *Orchid Review* and in the American Orchid Society’s magazine, *Orchids*. Hybrid names do

not end with species names in parentheses. When a hybrid is registered, it is given a special hybrid name. Early in the history of orchid breeding, hybrids were given either native language names or they were given latinized names such as *Paph. Maudiae* (registered in 1900). Today, latinized names are not allowed for hybrids so that confusion with scientific binomials is minimized. If *Paph. Maudiae* were created today it would be registered as *Paph. Maude*. The *Phalaenopsis* cross mentioned above, (*stuartiana* x *equestris*), was made and registered by Veitch in England in 1896. They called it *Phal. Cassandra*. Hybrids are registered by the plant breeder after a seedling has flowered. Hybrid names are as varied as clonal names and range from honoring people (*Cattleya* General Patton) to honoring places (Brassocattleya Mount Hood) to descriptive names (*Phal. Golden Sands*) to whimsy (*Cattleytonia Why Not*). When hybrids are registered, the information is condensed, and it becomes easier to read the plant labels. One of the EMYC’s favorite multifloral *Phalaenopsis* clones is a plant whose tag once read: *Phal. ([Carnival* x *Malibu Heir]* x *stuartiana*) ‘Selby’. The hybrid (*Carnival* x *Malibu Heir*) was registered as *Phal. Jolly Roger*. Then the hybrid *Jolly Roger* x *stuartiana*) was registered as *Phal. Charisma*. So, the same plants, following registration of the hybrids, are now simply *Phal. Charisma* ‘Selby.’ Reference books allow orchid breeders to trace the genealogy of modern hybrids.

**A World of Information**

The next time you see an orchid label, look it over and see what information you can extract. One of the Selby Gardens’ hottest hybrids was a *Phalaenopsis* cross with tags that read: *Phal. (Kathleen Ai* ‘Selby #2’ x *stuartiana* ‘Larkin Valley’). You should see that tag and realize that the seedling came from a select plant of the hybrid *Phalaenopsis Kathleen Ai*, designated as the clone ‘Selby #2’, that was pollinated with pollen of the ‘Larkin Valley’ clone of the species, *Phal. stuartiana*. The very best of these seedlings was selected and now carries the clonal name of ‘Selby.’

- Eric A. Christenson Director, EMYC

**CNYOS SPECIAL AWARDS FROM THE FALL  
SHOW, OCTOBER 14-15, 2000**



***Jim Rice Memorial Award for Best Species***

*Brassavola nodosa*  
Awarded to Bob Wyman  
Genesee Region Orchid Society



*Paph. tonsum v. curtisifolium*  
'Bloomfield Emerald'  
Award: CHR/AOS  
Grower: Joe Kunisch,  
Bloomfield Orchids



*Marjorie Ummer Memorial Award*  
Lc. Angel Heart 'Sweet Memory',  
HCC/AOS  
Awarded to Leon Frank  
Southern Tier Orchid Society

All photos courtesy of Elinor Burton.

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Water Quality Issues for Slipper Orchid Growers

**Water Quality Issues for Slipper Orchid Growers  
AnTec Laboratory - Bob & Lynn Wellenstein**

Everyone's conditions are very different, and you must balance the various factors of your growing with each other. What is stated here are the factors we take in to consideration regarding water quality: it is hoped that there may be aspects discussed that may be useful to you. We suggest that careful experimentation on small numbers of plants be carried out before anyone makes any major change in their growing conditions. Also, everyone does not have the same goals in growing, and may not be interested in trying to tease every last bit of potential out of their plants. As a result, we'll also discuss some options to consider if you want to grow these plants under less optimal water quality conditions without the extra expense and trouble of water purification.

The first step in determining water quality and how it will affect your Slipper Orchids is to get a water quality analysis. If you are on a municipal water supply your DPW should be able to provide one to you. Be sure to inquire if multiple sources of supply are used, eg. different wells or surface sources, as there can be tremendous differences between them that may cause large differences in your plants' health. If you are on a private well supply you will probably have to get an analysis done at your own expense. TDS (Total Dissolved Solids) is the sum of all the mineral constituents that are soluble in water. The presence of these minerals is determined by the geology of the watershed or course the water travels before reaching your tap and the solubility of rocks and soils the water comes in contact with. There are a wide variety of substances or dissolved solids like sodium, chloride, sulfates, calcium, bicarbonate, nitrates, phosphates, iron, and magnesium that the water picks up. For example, water that flows through limestone and gypsum dissolves calcium, carbonate, and sulfate. One test for TDS is performed by evaporating off all of the water in the test sample. The remaining matter is then weighed and the results are expressed as parts per million (ppm) or milligrams per Litre (mg/L). You can get a general idea of the TDS by measuring the specific conductance in microsiemens (hand held instruments for this can be purchased in the \$50 range) and multiplying by a factor of 0.55 to 1.0 to obtain the TDS in mg/L (ppm) (see explanation of the range below). Some notes on measurement are in order at this point.

- Electrical resistivity is the A/C resistance in ohms measured across a 1 cm distance of the water solution at a standard temperature. The unit of resistivity is the ohm/cm.
- Electrical conductance is the inverse of the resistivity, or 1/ohm= 1mho.
- 1 mho = 1 Siemen (S) = 1000 millisiemens(mS) = 1,000,000 microsiemens(uS)
- Grains, or grains per gallon (GPG) is an ancient measurement still in use roughly equal to 1 dry wheat grain (1/7000 lb). 1 grain per gallon = 17.1 ppm.
- 1EC (electrical conductivity or earth conductivity) = 1 mSiemen = 1000 uSiemens
- Electrical conductance meter readings cannot be exactly converted to ppm, although many are sold with scales reading in ppm. An approximation conversion factor has been added. Each dissolved salt in the solution has a different conductivity, a chart of representational values follows:

1 PPM of:	=	Approx. microsiemens/cm (20 C)
MgSO <sub>4</sub>	=	0.80
MgCl <sub>2</sub>	=	1.70
KNO <sub>3</sub>	=	1.10
K <sub>2</sub> SO <sub>4</sub>	=	1.20
KH <sub>2</sub> PO <sub>4</sub>	=	0.60
K <sub>2</sub> HPO <sub>4</sub>	=	1.04
NaCl	=	1.64

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## 10 THE ORCHID ENTHUSIAST

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### Water Quality Issues for Slipper Orchid Growers

(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	=	1.50
Urea	=	0.00

- pH is the measure of acidity or alkalinity of the solution, 7 being neutral, less than 7 acidic and greater than 7 basic. It is a log scale, so going from 8 to 9 is a ten fold increase (  $\text{pH} = -\log[\text{H}^+]$  )

Okay, we should have enough information there to let you be able to make conversions between any of the usual expressions of measurement of TDS in water, although if you are like me it'll make your head hurt.

The first step is to determine from your water analysis how your water stacks up for slipper culture. Don't depend on others opinions that XXX city water is great for orchids, so and so grew great Paphs, as everyone has different goals and idea of what constitutes good culture. If your water has a TDS level of 60 ppm or below and doesn't have excessive sodium (let's say its 5 ppm or less) or of the trace elements, you probably are one of those lucky folks that has perfect slipper growing water. I've seen water quality reports from North and South Carolina, Georgia, Colorado and the Downstate New York area with these wonderful values. You simply need to pick a fertilizer that matches your water, ie do you need any additional calcium or magnesium, or is your water adequate, and be careful what the pH of your water/fertilizer mix is, as your water may not be very highly buffered against shift. If the results are in the 60 to 120 ppm range, you'll have to make some decisions, perhaps based on experimenting with some of your plants and a purer water supply to see just how much improvement you may get in growth. At about 120 ppm range and up, or if you have sodium that's 10 ppm or higher, or excess microelements, if you are serious about growing your slipper to the maximum, you may want to consider a water purification scheme. A frequently asked question is regarding the possible use of bottled "spring water". The answer is, it depends on the analysis. Spring water is not necessarily low TDS water, in fact some are touted for their mineral content, so the same rules that apply to your tap water apply to the spring water, you need to ask for a typical analysis, or take a conductivity reading yourself on a sample.

If you have decided you are not satisfied with your tap water quality, your next decision is what to do about it. There are several options available which all give suitable results, the choice of which will revolve around water availability and relative cost in your area. Before we discuss these options, lets discuss some that are not suitable. Water softening is an ion exchange procedure that will make your water completely unsuitable for orchid growing. The procedure essentially replaces the calcium and magnesium ions in your water with sodium ions, and these makes the water ultimately toxic to your plants, and quite frankly not too healthy for you either. It is commonly suggested that you can use softened water if you substitute potassium salts for the sodium salts. This certainly is a much better solution, but again, if your water was high enough in TDS to start with to warrant softening, you are going to end up with very high potassium levels that can affect (antagonize) the availability of nitrogen, calcium, magnesium, iron, manganese, zinc and copper, so I do not feel this is a good option either. Your best bet is to get a tap installed in your plumbing ahead of the softener and take your irrigation water from this tap. You might also want to consider installing an under sink RO unit for your drinking water to reduce your sodium intake. Also, there are various cartridge filters available. Usually these are simply sediment, carbon, or special resin cartridges that are useful for increasing the taste and safety of the water for you, but do little in lowering the TDS you are concerned with for your plants. There are some small deionization units utilizing a mixed bed resin that will remove the TDS, but this type of disposable cartridge DI unit will be quite expensive to operate.

The easiest way to obtain pure water is to collect it in the form of rainwater or snowmelt. If you have the means to collect and store sufficient quantities that may be the least expensive option for you. A few cautions do apply, however. First, it's probably best not too collect the first several minutes of rain from any storm, let the worst of the atmospheric pollutants and debris on your collection surfaces wash away before you start collection. Also, be aware that rainwater in some parts of the country can be extremely acidic, normal rainwater had a pH of about 5.6 due to dissolved CO<sub>2</sub>, it will approach neutral upon sitting and outgassing for a few days, but we have measured the rainwater here in Upstate New York as low as 3.2, with a TDS of 22 even 30 minutes after the start of the rainfall. The final caution is to store the water in the dark, and consider adding a very small amount of a growth retardant such as Physan 20 to limit bacterial and algal growth.

The simplest method to purify water is distillation. The resultant water is quite high quality, but few people have access to the appropriate equipment. An average energy price to distill a gallon of water in the US is currently put at about \$ .35, and it is available in the supermarkets and drug stores in our area for about \$ .95 per gallon, so it is quite expensive an option, suitable probably only for someone with just a few plants or for experimentation to see if pure water will significantly help

Water Quality Issues for Slipper Orchid Growers

your plants.

The most mentioned method of water purification is by processing the water through a reverse osmosis filter. The principle is that as the water pass over the membrane water is able to pass through the filter while most of the dissolved solids can not. These are removed in a tangential flow pattern from the filter with the use of excess water, which is then discarded (in more efficient systems a percentage is recycled). Reverse osmosis can produce very high quality water in large quantities with relatively little energy input. The drawback is the "waste" water that is discarded, which can vary from 1 to 3 gallons for each gallon of pure water produced (higher efficiency units are available, but generally are out of the size range likely to be used in orchid culture), so if water is in short supply or very expensive, then this may not be the best option. We have used RO for many years now and are very pleased with the quality of the water. A note on purchasing RO units is also in order, they are not all made equal. RO unit output is dependent on water pressure and water temperature. It is also dependent on manufacturer, and quite frankly I've encountered at least one that badly over rates their systems, so beware, and if your system does not perform any where near the specifications, contact the supplier. Because your water pressure may not be as high as that at which units are rated, and also will almost certainly be colder, and because slipper growers tend to increase their collections steadily, I suggest you consider buying a unit rated several times over what you think you need. Also, you may be advised that your unit membrane will last much longer if you soften the water before processing. If you decide to go this route, consider using the potassium salts mentioned earlier in this article. RO units do allow some passage of the minerals across the membranes, my units let 6 to 10 ppm through, and if you are softening the water with sodium salts this will be 6 – 10 ppm of sodium you are letting through. The importance of softening to preserve membrane life increases with the efficiency of the unit, ours at 2.7 gallons of reject per gallon purified have given us about five years life running continuously and converting 250 ppm unsoftened water to the 6 – 10 ppm water we use.

Deionization is performed usually by a two tank apparatus, the first tank being the cation resin exchange tank where positively charged ions are exchanged with H<sup>+</sup> ions. This process produces acids which are removed along with other negatively charged ions by the anion resin exchange tank. The tanks need to be recharged periodically. Most systems are rented from a water purification company, and they will either regenerate the tanks on your premises periodically or preferably exchange the tanks with fresh ones for you (the recharge process involves the use of strong acids and bases). Cost varies according to region, but you usually pay a monthly rental fee for the unit and a per tank recharge or replacement fee. The water quality is excellent, the systems can produce large quantities of water on demand and with no wasted water they are an excellent choice where water conservation is of ultimate importance.

What can you do if you or someone you are advising has less than good quality water, but isn't in the position to take one of the described steps to improve the quality, and does not have access to rain water? There are several possibilities, one is to limit oneself to species and hybrids that are known to be less sensitive to higher salinity. Also, bear in mind that there are clonal variations in sensitivities, so exchanging divisions that grow successfully for others with the same problems is a good idea. You should also use fertilizer sparingly, and utilize ones with highly available nitrogen sources and little or no urea, so that the smaller amounts of fertilizer you can use will be utilized efficiently. You should also flush the pots extensively with you irrigation mix with every watering. Not allowing the media to dry completely will aid in salt elimination, but can also lead to rotted roots, so using a more open mix than you normally would and watering more frequently may also be of help, letting you water without the mix completely drying out but still keeping some air supply at the roots.

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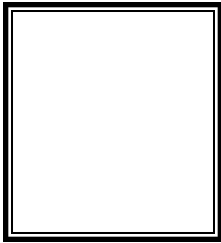
Anyone interested in the  
**Syracuse Botanical Club** can  
call Debby at 446-1273; e-mail  
[debbys@dreamscape.com](mailto:debbys@dreamscape.com).  
There will be a meeting on  
December 4 at 1:00, at the Soule  
Library in DeWitt, to discuss the  
possibility of a botanical garden  
in Syracuse. Dr. Leopold of the  
College of Environmental  
Science & Forestry will speak.

Next meetings: This Sunday -- November 5th at 2:00pm!!!



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## Central New York Orchid Society

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The Central New York Orchid Society meets at St. Augustine's Church, 7333 O'Brien Rd, Baldwinsville, at 2:00<sup>PM</sup> on the first Sunday of each month from September through June. Yearly dues are \$15.00 per individual, or \$17.00 family. Dues should be paid to the CNYOS Treasurer, Elinor Burton.

## THE ORCHID ENTHUSIAST

The **CNYOS Newsletter, *The Orchid Enthusiast***, is a publication of the Central New York Orchid Society and is distributed to the Society's members ten times per year, prior to all club meetings, events, or functions.

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