



St. Augustine Orchid Society

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Water Quality and Fertilizer

by Sue Bottom, based on information from Courtney Hackney at May 2009 Keiki Club

If you missed the Hackney's Water Quality Presentation in May of 2009, you missed a great learning experience. Courtney talked about water quality while Rose tested all the water samples brought to the meeting for pH (a measure of how acidic or alkaline your water is) and conductivity (a measure of how many dissolved salts you have in your water). You want your water to have a pH below 7 (neutral) and ideally in the slightly acidic range (say 6 or 6.5). You want low conductivity. Rainwater and distilled water are very pure and have very low conductivity. Most of the well water and public water supply in the St. Augustine area is derived from wells in limestone so it has a very high dissolved salts content as measured by its conductivity. What do you do with this information?

- ✿ The short answer is use a water soluble fertilizer (about one quarter or one fifth strength) that will tend to acidify your water and have organic matter (like fir bark, coconut husks or redwood bark) in the potting mix to buffer the pH and generate acidity. To deal with the high conductivity, once or twice a month thoroughly flush your pots to leach out residual salts.
- ✿ Water soluble fertilizers that tend to generate acidity are those that have about half of their available nitrogen in the ammonia form (the other half being nitrate, avoid urea formulas). A 20-10-20 or 20-20-20 fertilizer is a good choice to generate the acidity and help neutralize our alkaline water. A great nonacid generating fertilizer is Peters Excel 15-5-15 Cal Mag for use with pure water to moderately alkaline water.

Now for the longer answers:

- ✿ First, your source of water:
 - ✿ *Rainwater and Distilled Water* – have very low conductivities, which is great. This pure water also has virtually no buffering capacity so the addition of fertilizer can cause precipitous drops in your pH and the water can end up with the acidity of vinegar, very deadly for your plants. If you are using this pure of water, you will need to use a non-acid generating fertilizer with calcium and magnesium and micronutrients because they are generally absent. The slow release Dynamite may be a better choice in fertilizer because it will not cause such an acidic water quality.
 - ✿ *Well Water or Public Water Supply* – will generally be alkaline and high in dissolved salts in the St Augustine area. If you use an acid generating water soluble fertilizer, you can reduce the pH (or acidity) in the root zone, but the salts in the fertilizer also caused a rise in the conductivity, a greater increase with increased fertilizer strength. The best way to handle this is to use a very dilute fertilizer. Shoot for a nitrogen content of 70 ppm, use the [calculator](#) to figure out how much fertilizer to use. Then flush your pots religiously, once or twice a month, with your raw water. Water the plant until water runs out the bottom of the pot and then water some more. This will dissolve the salts. Wait



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15 to 60 minutes and then repeat this flushing procedure, this will flush the dissolved salts out of your pot.

✿ Second, your potting mix:

- ✿ *Sphagnum Moss* – is a very water retentive medium that becomes so acidic (a pH of around 4) that bacteria and fungi cannot survive. It also breaks down fairly rapidly, with a life of one or perhaps two years. Some growers swear by sphagnum and others cannot successfully grow in sphagnum because they overwater it.
- ✿ *Organic Matter* – like fir bark, coconut husk and redwood bark will increase the ability of your potting mix to hold some of the water and nutrients so they will be available to the plant for a few days after watering. They will decompose over time and one of the byproducts of their decomposition is increased acidity. It is best to choose a fertilizer where the nitrogen is not in the urea form (which the bacteria will feed on and cause the organic matter to decompose more quickly). Better for the nitrogen to be in the ammonia or nitrate form which is available to the plant immediately. Redwood bark in particular generates acidity.
- ✿ *Lava Rock* – is favored by Courtney because its large surface area allows it to hold a lot of water for later uptake by the orchid. It will build up mineral deposits so it is important to flush the plant regularly. Courtney reports difficulty using the slow release Dynamite because it is easily flushed from the pot.

✿ Third, your fertilizer:

- ✿ *Micronutrients* – include the macro micro nutrients calcium and magnesium and the micro micronutrients like copper, zinc and other trace elements. With well water or public water derived from wells in limestone, there is probably plenty of micronutrients present. The problem is the plant cannot use these micronutrients if the water is too alkaline, so you must make the water acidic through the acid generating water soluble fertilizers and organic matter you use in your potting mix. Once you can lower the pH to below 7, the plant can use the micronutrients present and you do not need to use a specially formulated fertilizer.
- ✿ *Slow Release Fertilizers* – like Dynamite (not Osmocote) are great because they will last for 6 months or so and will give a low dose of fertilizer to your plant each time you water. Use a half teaspoon or so per plant in April when new growth begins. For vandas, you can add some to a bag made with panty hose, surround it with a bit of sphagnum moss and tie this to the stem above the roots.
- ✿ *Lime* – Paphiopedilums love a slightly alkaline environment and extra calcium and magnesium. Mix a few tablespoons of dolomitic lime in a gallon of water and water your paphs and add say a teaspoon of the lime to the top of the pot each month and watch your paphs jump out of the pot!