



St. Augustine Orchid Society

www.staugorchidsociety.org

Fertilize Weakly Weekly?

by Sue Bottom, sbottom15@hotmail.com

Many of the orchids we grow as hobbyists are epiphytes, growing on the sides of trees where nutrients are scarce, so they are very efficient at capturing dissolved minerals. This is quite different from your other garden plants that grow in soil, which holds nutrients for easy uptake. The instructions on most water soluble fertilizer package usually say something like apply at the rate of 1 teaspoon per gallon. They don't give specific application rates for your philodendrons, your roses or your orchids. You often read you should fertilize your orchids weakly weekly, perhaps because it is an easy adage to remember. How much fertilizer should you apply to your orchids? Well, it's complicated and there are quite a few factors to consider.

Are Your Orchids in Active Growth? Most orchids accelerate their growth rate when the days lengthen and the sun intensity increases in the spring. Your goal is to match the fertilizer application rate to the growth rate, so the availability of nutrients is not a limiting factor. Many, but by no means all, orchids rest during the winter months. Most cattleyas don't require much, if any, fertilizer in winter. The winter dormant orchids like habenarias and catasetums should be kept mostly dry, with no water or fertilizer in winter. The soft cane dendrobiums like a coolish, dryish winter with occasional waterings but no fertilizer; the fertilizer will encourage the formation of keikis rather than flowers. Alternatively, phalaenopsis continue growing in winter and should be fertilized, albeit at a lower rate.

What Media Are You Using? Sphagnum moss and peat based mixes like Pro-Mix tend to hold the fertilizer salts more tightly than coarse or inorganic media, so salts can build up in the mix. The nature of the mix makes it very difficult to flush, so more dilute fertilizer should be used with salt retentive media. Organic media like bark will hold onto some nutrients, which can be absorbed over time by the orchid. Many orchid books recommend a high nitrogen fertilizer like 30-10-10 be used with bark-based mixes, but this has the unintended impact of hastening the degradation of the bark by the microbial population that consumes the extra nitrogen. Inorganic mixes like clay pebbles and charcoal may adsorb salts onto their surface, but this is generally not available to the plant later. The SAOS coarse mix is about 30% bark, 30% coarse perlite, 30% clay pebbles and 10% charcoal, so it will provide some nutrient retention while providing airy open pore spaces for the roots.

How Many Soluble Salts Are in Your Water? If you are using well water typical in St. Augustine, you notice lots of white hard water marks on your plant leaves from all the calcium bicarbonate in the water. This water tends to be alkaline, has plenty of calcium and not much magnesium, and, over time, it can increase the pH around the root zone of your orchids leading to nutrient deficiencies. This water also tends to be high in soluble salts, and the addition of fertilizer, which is basically another salt, just increases the salt content of the water so the conventional wisdom is to try to minimize fertilizer additions to prevent salt toxicity. The different salts compete with each other for uptake, so you may actually have to increase fertilizer rates so the plant receives enough of each of the nutrients it requires. If you have pure water like rainwater or reverse osmosis water, you have the opposite situation. You must supply all the nutrients to your plants. If you have tap water, you are likely somewhere between these extremes. You should consider selecting your fertilizer and nutrient supplements based on your water quality.



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How Often Do You Fertilize? Many of the orchid books recommend you fertilize weekly flushing with plain water monthly, or fertilize every other time you water, flushing with plain water in between. Some orchid growers and many commercial growers use a continuous liquid feed. They fertilize with a dilute solution each time they water their orchids. More dilute solutions more frequently seems to be closer to the natural environment in which epiphytic orchids evolved. If you only fertilize once a month, you should apply fertilizer at a higher concentration than if you would if you fertilize more regularly, recognizing that most of the fertilizer will drain through the bottom of the pot.

Are Your Orchids Heavy Feeders? Vandas and cymbidiums tend to be heavy feeders desiring more fertilizer than light feeders like paphiopedilums and cattleyas. The drought enduring orchids grow more slowly than many other plants because they use the CAM photosynthesis pathway. They keep their stomata closed during the day to limit water loss, and open them at night to absorb carbon dioxide that is stored until daylight when photosynthesis begins. This adaptation allows them to endure drought, but it requires the expenditure of extra energy, so they grow more slowly than their counterparts that absorb carbon dioxide and photosynthesize concurrently.

How Do You Balance These Factors? Many of us have mixed collections of orchids and it is impractical to use one fertilization rate for one group and a different rate for another. Instead, select an application rate that is suitable for all of your orchids, perhaps $\frac{1}{4}$ to $\frac{1}{2}$ teaspoon per gallon weekly in summer and $\frac{1}{8}$ to $\frac{1}{4}$ teaspoon per gallon weekly in winter. Even better is using a dilute fertilizer with every watering, so you can match the nutrient demand to the orchid's growth rate. If you water twice as often in summer than winter, you will naturally be supplying twice the fertilizer to your plants. You can also supplement the heavy feeders with some time-release fertilizer. Blend in some time-release fertilizer with your potting mix when repotting your catasetums, or top dress your spring blooming phals in the fall to encourage blooming.

The purpose of fertilizer is to supply your plants with the building blocks they need as they harvest energy from the sun to produce new growths and flowers. Some of these building blocks, like calcium, magnesium and micronutrients, may be naturally present in your water, unless you are using a pure water source like rainwater. Some water-soluble fertilizers contain calcium and magnesium, while others do not, and even those with calcium and magnesium may not have enough. You should select a fertilizer that is best for your water quality.

In the St. Augustine area, the well water is less than desirable because it contains a high level of dissolved salts, with lots of calcium bicarbonate. The bicarbonates will accumulate in the root zone causing it to become too alkaline, which can lead to nutrient deficiencies. An acid reaction fertilizer can help prevent this from occurring. This high salt content can also limit the types of orchids that will grow well for you, which is one of the reasons many of our growers have switched to using rainwater for their orchids. With a pure water source, you have to supply all the nutrients your plants require. Here are some fertilizer suggestions for the water typical in our area.



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	Well Water	Tap Water	Rainwater or RO Water
Water Quality	Your water is likely very alkaline with many dissolved salts including high levels of the beneficial calcium, low levels of magnesium ions and possibly low to high levels of toxic sodium and chloride ions.	Your water is likely slightly alkaline with an acceptable to borderline level of dissolved salts, some beneficial calcium and magnesium ions and possibly low to high levels of toxic sodium and chloride ions.	Your water contains no dissolved constituents so you will have to supply all the building blocks your plants desire, including calcium, magnesium and micronutrients that are not found in all fertilizers.
Preferred Fertilizer	Acid reaction fertilizer like Jack's or Peter's Classic 20-10-20 or Peter's 20-10-20 plus Epsom salts	Jack's 15-5-20 Tap water formula, or alternate between rainwater and well water fertilizers	Cal Mag fertilizer like Peter's Excel 15-5-15 or Jack's 12-4-16 RO formula

Then you have to decide how much fertilizer to give your plants. Most people make this decision on the basis of the nitrogen content, the first number in a fertilizer formula, although the levels of calcium and magnesium are just as important for your plant health. For my mixed collection of orchids using reverse osmosis water, I try to provide 60 ppm nitrogen, 50 ppm calcium and 20 ppm magnesium in summer with every watering, and 40 ppm nitrogen, 30 ppm calcium and 15 ppm magnesium in winter. With my RO water, I have to add calcium nitrate and magnesium sulfate supplements in addition to fertilizer to get to the desired concentrations.

Orchids are efficient scavengers of nutrients. In their natural environment, mineral nutrients are rare, so orchids have evolved to absorb every atom they encounter. Over fertilizing your orchids means you are giving them more fertilizer than they can use efficiently given the amount of light, air and temperatures they are exposed to. If you supply too much fertilizer to your plants, you run the risk of having lush, soft growth that is more easily attacked by pests and diseases. Plants grown with less fertilizer will not grow as fast perhaps, but should be stronger and more resistant to problems.

Fertilizer is less important than many other aspects of orchid growing. The legendary Rebecca Northen wrote that beginners should not fertilize at all, they should master the elements of light, temperature, air and watering first, and only then start fertilizing their orchids. Dave Off of Waldor Orchids, who grows the most immaculate mature cattleyas, says they don't fertilize their orchids except for after repotting when they are top dressed with some time-release fertilizer. Start your fertilizer program at a quarter or eighth strength for a growing season, after which you can decide if more or less fertilizer is better under your growing conditions.



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Application Rate	Nitrogen (ppm)	Calcium (ppm)	Magnesium (ppm)
Peter's 20-10-20 or 20-20-20 GP**			
¼ tsp/gal	75	0	0
½ tsp/gal	150	0	0
1 tsp/gal	300	0	0
Magnesium Sulfate (MgSO ₄)**			
¼ tsp/gal	0	0	35
½ tsp/gal	0	0	70
1 tsp/gal	0	0	140
Jack's 15-5-20 Tap*			
¼ tsp/gal	50	10	5
½ tsp/gal	100	20	10
1 tsp/gal	200	40	20
Peter's Excel 15-5-15 Cal-Mag*			
¼ tsp/gal	50	15	6
½ tsp/gal	100	30	13
1 tsp/gal	200	65	26
Jack's 12-4-16 RO*			
¼ tsp/gal	40	25	7
½ tsp/gal	75	45	15
1 tsp/gal	150	90	25
Calcium Nitrate (Ca(NO ₃) ₂)*			
¼ tsp/gal	60	70	0
½ tsp/gal	115	140	0
1 tsp/gal	230	280	0
Items marked with one asterisk are compatible and can be mixed together, and items marked with two asterisks are compatible and can be mixed together			