

St. Augustine Orchid Society

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Evolving Thoughts on Fertilizing Your Orchids

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We all know that fertilizing our orchids is essential to getting them to grow well, stay healthy and provide us with flowers. What the grower rarely knows is what type and how much to use to optimize our plants.

Over the last hundred years, as orchid growers have learned from their mistakes and as science has given us more insight, we have changed how we fertilize. In the early days, orchid growers would water the plants before and after fertilizing. With today's water soluble fertilizers, we no longer have to worry how 'hot' our fertilizers are compared to the organic manure based fertilizers of yesteryear. The admonition to water first and then fertilize still makes sense in some situations. If your orchids media is bone dry then watering an hour or two before fertilizing is a good idea so the media and roots can readily absorb the fertilizer. Watering a day or two after several fertilizer applications will flush out any excess salts. Old habits should persist if their rationale makes sense.

There are four things to consider when fertilizing: the soluble fertilizer we use, the water we dissolve it in, the potting media that delivers the nutrients to the roots and the current needs of the plant. The two most important variables are the fertilizer and the water. Here in Florida water comes in three varieties, well, tap and purified water (rainwater or reverse osmosis treated water).

- Well water, in our area, is largely untreated and generally high in calcium and bicarbonate, and may contain sulfur in the form of sulfides and sulfates and possibly low in magnesium. Some ground water is unsuitable both for plants and people due to high alkalinity and potentially toxic minerals levels of sodium and chlorides. Even if it is acceptable from a drinking water standard, it may not be suitable for use on your plants.
- If your water is from a public water supply, it has undergone some treatment so the pH may have been adjusted, and the alkalinity lowered, but they often don't remove the potentially excessive levels of sodium and chlorides, which can be toxic to the plant's health. So, the first task it to know what you have coming out of the tap. City water is tested by the health department to be sure to keep people safe but their reports are useless to a plant grower. Only a report from a water testing lab with parameters listed for plant nutrients, alkalinity, trace anions/cations, pH and electrical conductivity as well as calculated values like water hardness are needed. Fortunately, the soil lab within IFAS in Gainesville will do the basics for your irrigating water for $20. You provide them a full



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water bottle, their form and a check and you can get the report in a few days. Commercial labs will do it as well for a lot more parameters but at more expense.

- Reverse osmosis treated water or rainwater has no appreciable minerals, a neutral pH and little alkalinity; a blank slate so you have to add all the nutrients your plants require.

Knowing the pH of the root zone tells us whether the potting media is either acidic or basic, which is important both in fertilizer selection and more importantly in improving the absorption of the critical minerals by the roots. Most of our epiphytic orchids need the media to be a little acidic to get better absorption. If there is no substrate at all, such as with many Vandas, the water should be a little acidic. Bill Argo's article on pH shows that most soils tend to be acidic with a pH range from 4 to 8. Across this range, nitrogen, potassium, calcium, and copper are absorbed at about the same rate. Below 6.5 the rate of absorption increases for phosphorus, iron, manganese, boron and zinc. With alkaline substrates having a pH greater than 7, only magnesium absorption increases.

If you use a tank solution of fertilizer, the pH can be adjusted simply by first measuring the pH by using a pH strip in the 4-8 range which are inexpensive and available from the internet or pool or agriculture stores. For those using a Dosatron or Hozon siphonex, you have to test the water at the hose end. Look at the water analyses report on your alkalinity, the higher the number, the more acid may be required to counteract it and buffer the solution. My well has a moderately high alkalinity, over 150, and it is not uncommon for other wells in the county to have alkalinities over 300, so we water with "liquid rocks" and readily see salts accumulate on the clay pots and orchid leaves. Very high alkalinity water (300-500) may contain so many soluble salts that an alternative water source should be investigated, in addition to other cultural adjustments to flush salts from the root zone.

In most cases the higher pH of our well water can be adjusted down safely by adding common vinegar or citric acid. There is no magic level, but I aim for 6-6.5 pH. If you use an injection system, hozon siphonex or use a hose end sprayer, you will need to add more acid to the reservoir to compensate for the dilution water as you feed. The pH of your water/fertilizer mix may differ from the raw water as well as the actual pH in the root zone because fertilizers produce either an acidic or basic reaction in the root zone depending on the types of nitrogen salts used. The best way to check the root zone pH is to pour a small amount of distilled water through the pot an hour after fertilizing and check the pH.



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Fertilizers add the major nutrients not in the water and in the case of rain water, the fertilizer has to supply all the nutrients. Be sure to select a balanced fertilizer with the micronutrients needed. In the June 2003 Orchids article that introduced the MSU fertilizers to the orchid growing community this was said. “Balance does not necessarily mean equal (i.e., 20-20-20). A balanced fertilizer supplies a correct ratio of all nutrients in adequate amounts for normal growth. Once a sufficient amount has been supplied to the plant there is no benefit in adding extra. “ There is a “Goldilocks” zone of just right for all the needed nutrients; too little and no growth or too much can be toxic. Remember that the more frequently you fertilize the less fertilizer you need to use with each irrigation.

Deciding how much fertilizer to put in the mix is the first decision. All concentration calculations start with the target nitrogen expressed as parts per million (ppm = mg/l). If you fertilize at every watering (continuous feeding) use 60-100 ppm. But weekly or semi-weekly waterers can use more, perhaps up to the 100-150 ppm N range. Going over 200 ppm N can cause weak floppy plants from too rapid growth and the potential for toxic concentrations of the micronutrients. Calculating how much fertilizer to measure out is a math problem that is best done using the fertilizer manufacturers website.

- If you have rainwater, reverse osmosis water or municipal tap water go back to that Orchids article. Their standard recommendation is MSU RO Water Special 13-5-15 Cal Mag. MSU fertilizer is named for Michigan State University where the formula was developed, and is basically synonymous with Cal Mag fertilizer that has calcium and magnesium in addition to the standard nitrogen, phosphorus and potassium formulations. GreenCare makes these fertilizers under the brand name Tezula with a green label and is available on the internet. However, several companies make 15-5-15 Cal Mag formulations too (Jack’s and Peter’s). Whatever fertilizer you use, please read the label to be sure that your nitrogen is nitrate nitrogen and ammoniacal nitrogen rather than urea nitrogen that can’t be absorbed by orchids directly. Urea formulations are cheaper but are only ok for plant in soils with bacteria to convert it.
- If you have well water in St. Johns County, you need to balance out the high alkalinity present in your water as well as variable levels of magnesium. This is a similar problem found in MSU’s wells so the formula they recommend is 19-4-23. Because of the high alkalinity of this water, a greater proportion of ammoniacal nitrogen is used to buffer the alkalinity. Again, this MSU formulation is made by GreenCare also using the brand name Tezula but with purple packaging. Other close options are also available, so go with the



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> Peter's Excel multi-purpose (21-5-20) supplemented with Epson salts (at about 25 ppm or ¼ teaspoons per gallon). Alternately, you can go with a chemist's approach recommended by Martin Motes using available a 20-20-20 formulation alternating the following watering with potassium nitrate (13-0-44). This reduces nitrogen and phosphorus but increases potassium.

The MSU fertilizer formulations ruled until Rick Lockwood wrote the "What do orchids eat? article in March 2013 in Orchids. In it he outlined the work of tropical ecologists that analyzed mineral content in forest orchid's mature and older leaves and tropical leaf litter. The results showed that orchids are greedy in absorbing nutrients from their substrate and recycle about half of the nutrients from old leaves, but not so for calcium and magnesium. In comparing this data to tropical leaf litter, he noted that potassium is rare in the environment especially in calcareous environments so it is actively taken up by orchids and retained by recycling it. Based in these lower requirements for phosphorus and potassium (K), he lowered them from the MSU formulations. Testing his collection, he reported great success especially for those plants that were languishing. In coordination with GreenCare they released a product call MSU K-lite (12-1-1) which is also available as a brand named Tezula K-lite with black packaging. Another option is from First Rays K-lite plus (14-1-1 8Ca 3Mg). Many growers report great success with these formulations. Also, available at your hardware store are organic fish emulsions that often have a similar nutrient profile albeit at much lower levels and with no Ca/Mg component.

For years, in the market there has been an orchid fertilizer option designed to make your plant bloom better. These high-phosphorus plant foods (such as 15-30-15 or 10-30-20 NPK ratios) are marketed to encourage heavier flowering and fruiting. Based upon what we know now these formulations, their advantages are generally discounted. Some sources still recommend bloom boosters in the fall to prepare plants for their winter rest, more to reduce nitrogen than provide excess phosphorus, but I question the rationale.

So, in conclusion, I recommend MSU RO Water formulations for those that use tap water, rainwater or reverse osmosis treated water. If you have well water, use the MSU well water formulations and if needed add more magnesium. If you have mature plants that are languishing, try a MSU K-lite formulation. Please also consider looking at other articles on the site that discuss additives to perhaps enhance your success further.

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