pH and the Orchid Grower.

"pH" is a simple matter and most orchid growers deal with it very successfully every day, unconsciously.

It is in human nature to grow things and over thousands of years we learned everything there is to know in a practical way. Not many people know or care about the theory behind the success. For example: Today we know that, when it comes to watering plants, rainwater is better then tap water. We say rainwater is better than Tap water but what we actually mean is: pH 6.4 is better than pH 7.2.

We don't pay much attention when others talk about pH and we don't compare or evaluate given numbers in our mind or commends made. It is easy to "throw" pH numbers around but do these numbers make sense?

Speakers rarely say what they think or something challenging, but say things that are common knowledge. Presented views are researched and in many cases based on information found online or comments made by a friend. Their motto is "if it is online must be good".

The pH value of the soil is paramount important to orchid growers because it affects not only the availability of nutrients to plants, but also the activity of soil microorganisms.

Nutrients are not living organisms and for the plants to "absorb" them, the nutrients must be water-soluble and in "solution". However, the nutrient requirements differ. Every nutrient is in "solution" within a specific pH "range" and outside that pH range it will flocculate. For example Iron. Iron is not easily accessible in alkaline soils and consequently, plants suffer from "Iron chlorosis".

THE ANSWER TO THE QUESTION: WHY RAINWATER IS BETTER THAN TAP WATER?

For the plants to benefit, and for the grower to save money, it is important to make the effort to keep the soil pH within a range that suits all nutrients. Fortunately, that pH "range" does exists and is the pH of the rainwater (pH 6.4). When the pH is 6.4, all nutrients (macro- and micro nutrients) needed by the plants are in solution at their maximum solubility. Tap water has a pH over 7.0.

pH is a measurement of the acidity or alkalinity of a soil. Values 1.0 – 6.8 are considered acidic; values 7.2 -14.0 are considered alkaline; and values in the range of 6.8 - 7.2 are considered to be neutral.

High rainfall areas are expected to have acid soils and areas with low rainfalls alkaline soils. Given time soils become acidic as naturally occurring elements that contribute to higher pH, such as Ca and Mg are being leached out.

A soil pH above 7.5 indicates the presence of free lime (high calcium carbonate content). Alkaline soils can be improved by increasing the organic matter (mulching) and watering; however, when the higher pH value is due to the presence of free lime, the pH cannot be improved much. However, things are not as simple as that.

The genus of interest here is the "slippers". Many slippers species are found growing in "Limestone Mountains" in Borneo, Vietnam, China, etc. The word "Limestone" suggests that the mountains are almost mono-mineralic, containing predominantly either Calcite

(Calcium Carbonate) or Dolomite (Calcium Magnesium Carbonates), are alkaline and have lots of “Free Lime”.
We know the orchid roots grow in cavities and cracks and that these cavities and cracks are filled with organic matter (acidic matter). There are frequent rainfalls in those areas, (rainwater pH 6.4), and nutrients being soluble in rainwater are available and absorbed by the leaves and stems as well as the roots, every time it rains. It is a very complex relationship and nobody can or should try put a pH figure on it. The environment is alkaline (pH 8.0 – pH 9.0), but the plants live in their own world (pH 6.5 – pH 7.5). That should not surprise anyone; “micro worlds” do exist. People in Alaska and north Sweden do live in extreme winter environments with outside temperatures of -40 degreed Celsius, their “micro world” is their centrally heated house and 23 degrees Celsius.

“Calcaresous” is another word often used by speakers, a word which is not very specific. It implies that there is a high Carbonate minerals component, but says nothing about the rest. For example: How soluble are the Carbonates present? Limestone Mountains cannot be called Calcareous Mountains.

Sulfur is the one chemical that can be used to lower pH, it can be used as Elemental Sulfur, as Iron Sulfate, as Aluminium Sulfate, or Urea (Ammonium fertilizers).

Acidic soils can be improved by simply adding lime $Ca(CO3)$ or dolomite $(Ca, Mg)(CO3)$. Clay rich soils require more lime. Dolomite is more suitable to treat sandy soils that are low in organic matter as it may supplement low magnesium levels.

Carbonates are sold as “agricultural lime” or “agricultural dolomite”. The finer the grind, the faster it reacts in lowering pH.

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