Understanding pH by Jim Brydie

On the pH scale, 7 is neutral, below 7 is acid, and above 7 is alkaline.
As you go further and further away from 7 the environment becomes either more and more acid or more and more alkaline. However, the pH scale is logarithmic, meaning that an increase of one whole number in pH represents a tenfold change in the acidity or alkalinity of the medium. For example, a pH of 3 is ten times more acidic than a pH of 4, and one hundred times more acidic than a pH of 5. Which obviously means that small changes in pH can be very important.

I am not suggesting that everyone rushes out and buys a pH measuring kit, but I do want you to understand articles or discussions concerning pH.

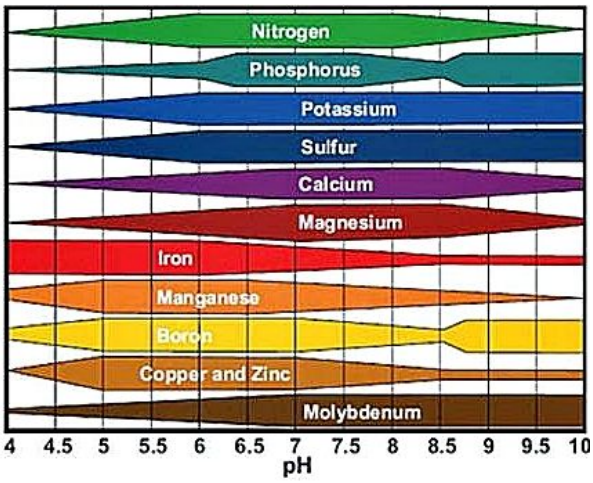
Having a grasp on expected pH

pH is a measure of the potential of Hydrogen ions in a solution. At a technical level, In pure water, which is neutral (neither acidic nor alkaline), the concentration of the hydrogen ion is 10^{-7} gram-equivalents per litre, which is expressed as a pH of 7. You don't need to understand what 'gram-equivalents per litre' means but :

the following common pH measures should be locked in your head as a basic functional understanding.

- Pure distilled water is more or less 7 depending on the process creating it.
- Sydney tap water is somewhere just above 7 so is just a fraction alkaline, but very little.
- Water on a hillside that has likely leached through limestone might be around pH 8 (many Paphiopedilum species come from areas with at least mildly alkaline pH water)
- Water in an orchid pot, potted in a mix predominately composed of Pine bark – around pH 6 when fresh.
- Water from that same orchid pot say 3 years later (with no lime/dolomite added) will be pH 4 to 5
- Fertiliser added to a pot (soluble or otherwise) may affect the pH either way depending on the chemical make up of the fertiliser. The label on the pack mya help you work it out, - BUT, if you are only using the fertiliser lightly, AND flushing with clean water in between applications, I don't believe the fertiliser will seriously change pH over time.

Why pH is important? The importance of pH to plants (and to animals) is that the various natural mineral elements they need for growth and to make new tissues (minerals like nitrogen, potassium, phosphorus, carbon, magnesium, iron, zinc, etc), are only available to a living organism from the water they take u and then through a chemical interchange within their cells. That process is affected by the pH of the solution in which the uptake occurs. At different pH levels, different elements become unavailable or much less available, and some others become more accessible. If you google 'pH scale' there are many table graphs like this that show these relationships.



The recommended pH range for orchids is 6.0 to 6.5 as this is the range at which there is maximum balance of the availability of all the nutrient elements in the fertilizer you provide. Orchids will of course tolerate a much wider range of pH than this and some orchid may even prefer slightly different. Some orchids are touchier than others and the roots of some orchids (such as Paphiopedilum and Odontoglossum and a few others), will only live and thrive in environments within a narrow range of pH. In my experience, their roots decline rapidly as the potting mix ages, most likely because it gets too acid, stays too wet, and air in the pot is reduced.

Potted Plant pH Changes Over Time.

The pH of every organic potting medium will change over time. The pH of non-organic materials like Perlite, and fired clay Leca Balls, or sand, do not change where these are just a component of a complex mix including organics the pH will become more acid as the organic material deteriorates. Bark is especially prone to acidification over time.

As a grower you can't ignore the issue. Pine bark mixes are best replaced every 3 years or at least regularly subjected to some pH adjusting additive like lime or Dolomite.