

December 2007 - Orchid Detective; What Your Plants' Roots are Trying to Tell You

A monthly growers advice column by Courtney Hackney. Hackneau@comcast.net

The growth of plants is directly tied to a root system that delivers enough water and nutrients to accommodate the plants needs. While your orchids may not consciously decide to grow additional roots because they need more water, the same effect occurs through plant hormones. What this means to the orchid grower is that the degree to which your orchids allocate energy for root or leaf growth depends on what they have in least supply relative to how much they require.

This is actually an old concept developed by a German soil scientist, called "Liebig's Law". If an orchid is being grown and has less water available than it needs, it will grow additional roots. Conversely, if a plant has an adequate water supply in the presence of lots of light and nutrients more leaves will be added by the plant.

In "the wild", the proportion of roots to shoots reflects what is limiting plant growth. More roots than shoots suggests water or nutrient limitations. Some desert plants have a 20 to 1 ratio of roots to shoots, while under almost ideal conditions in rainforests; this ratio can be almost 1 to 1. What is the ratio of roots to shoots on your orchids?

Most cultivated orchids are epiphytes, that is, they grow attached to trees or rocks and do not have access to soils where water and nutrients are stored in nature. Epiphytes in general are especially adapted to resisting water and nutrient loss and holding on to what they have, but still reflect a root to shoot ratio more than 1. One additional trick orchids use is to grow slowly to lessen their need for nutrients and water.

Cultivating epiphytic orchids requires us to be sensitive to the balance each plant maintains. Only when that balance is maintained will the plant favor us with exceptional blooms.

The orchids in my greenhouse came from many different growers that grow in all kinds of media, so there has been plenty of opportunity to observe both the quantity and quality of roots and the approximate root to shoot ratio. Phals have been especially noteworthy as a means of comparing roots because they are among the fastest growing cultivated orchids.

One commercial grower was noted for beautifully large, well-flowered phals grown in Promix. However, his phals had few roots when repotted and had a root to shoot ratio below 1 to 1. Obviously, he had mastered the "art" of maximizing nutrients and water availability. His plants did not require additional roots to obtain either water or nutrients, and so spent their available energy on growing more leaves and flowering. Most amazing was that this was done in a dense medium without suffocating the roots. Most hobbyists have difficulty obtaining this kind of growth without killing roots.

Hydroponic-growers accomplish the same thing, i.e. a low root to shoot ratio, by constantly bathing their plants in water and nutrients in an oxygen rich environment. Remember that roots need oxygen to grow. Phal growers using sphagnum moss also obtain rapid growth and also do so by growing fewer roots. However, their roots are very thick and fleshy because phal roots grown in a constant supply of moisture take on a different form. If repotted in a more open mix, these roots will die.

Grow phals mounted, in lava rock or other coarse medium, and there will be more roots than shoots, reminiscent of their natural state. These roots will be hard and flattened for life attached to a tree. Repotting a phal that is adapted for such conditions will lead to the loss of most roots during and immediately after repotting. The result is usually fewer and smaller flowers the following year. The more growing time between repotting and flowering, the better the flowers will be. This is the reason most commercial growers repot after their plants have flowered. Growers that consistently get AOS awards have mastered Liebig's Law.

Jacksonville Orchid Society member Dr. Courtney Hackney, Retired Emeritus Professor of Biology at the University of North Florida, is a noted author and acknowledged "orchid expert." He published a column of orchid advice that ran for many years, and we are presenting select articles with his permission.

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