

Soil Permeability Can Be the Key to Good Growing

The soil we use in the greenhouse has three principal functions: anchorage for our plants; storage of plant nutrients and water; and supplying air to the plant roots.

This last function is often considered only after serious trouble arises. Without adequate oxygen the roots deteriorate and top growth suffers. New growths are thin and spindly, flowers are inferior. All plant functions are impaired because without adequate roots water and nutrients are limited.

Poor soil permeability stems from tight soils. An original soil may have such an unstable structure that it melts together when frequently irrigated. Studies made by Colorado State University several years ago indicated that Colorado greenhouse soils on the average had the lowest porosity the first year they were used and improved in this respect for at least 3 years.

Porous soils lose their good condition when mishandled. This might include overwatering, the addition of too much organic matter, or a gradual leaching of the humus and clay colloids to the bottom of the bed causing an impermeable layer. All of these problems can be observed wherever greenhouse plants are grown.

Soils with tight structure must be watered cautiously. When the limited pore space is filled with water, the oxygen is driven out and plant roots suffer or die. Adequate drying between irrigations is the only corrective measure for this situation until the bench can be replanted and the soil structure corrected.

Heavy applications of organic matter increase the population of soil organisms which compete for air directly with the plant roots. As the organic matter decomposes and becomes humus a part of it is leached through cracks and large pores and helps to form the hardpan layer at the bottom of the bed. For these reasons organic matter should be added in small amounts on a yearly basis, preferably in a partially rotted state. Over a period of years we have had excellent results from the use of half rotted leaves. They are used as a one-inch mulch of litter after plants are well established from transplanting.

To correct the hardpan layer which often forms at the bottom of beds every 4 to 8 years, the only practice known to be successful is that of turning the soil over, making sure that the layer is thoroughly broken up. This type of layer will also form on top of sand which has been placed in ground beds for drainage.

Synthetic soil conditioners have a place in correcting some of the problems arising with soil structure. A soil can be corrected between crops at a more reasonable cost than new soil, and new soil often needs some correction before it is used.

We should keep in mind constantly just what we want from an ideal soil. We want it to hold enough water and nutrients for our plants, but it must never let their roots lack for air.

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