

# Using Air Movement for a Better Greenhouse Environment

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The environment inside a greenhouse is a closed system. By design it is separated from the outside environment to create an agreeable environment for growing plants when climatic conditions would otherwise prevent such activity. Unless carefully controlled, however, this artificial environment can greatly amplify certain conditions that are detrimental to growing plants. Good greenhouse management minimizes and controls these adverse conditions in a way to allow for an optimum growing environment. The free movement of air inside a greenhouse has been shown to have a positive influence on the proper control of important environmental conditions such as temperature and humidity.

The surfaces of plants growing outdoors in a natural environment are continually in contact with currents of moving air. This air movement performs several important functions. In situations where plant foliage has been wet by dew or rainfall, air movement tends to dry these surfaces. Dry plant surfaces are less likely to be invaded by disease organisms. In hot dry situations, the movement of air will help to evaporate plant moisture, thereby cooling the plant. During cold weather, particularly on cloudless nights when cooling by radiation is maximized, the movement of air over plant surfaces will have a warming effect, reducing chill injury.

There is very little natural air movement in a closed greenhouse. Weak natural convection currents present on sunny days provide only a small amount of air movement. On cloudy days and especially at night, there is practically no air movement inside a tight greenhouse. In such cases, still air will rapidly stratify into distinct layers of warm air near the roof and cold air near the floor. Air temperature measurements taken near the floor and roof of a 12-foot tall quonset type greenhouse has shown as much as an 18 degree difference.

Beneficial air movement necessary for proper greenhouse management does not require high air velocities. Air velocities as little as 40 feet per minute (1.5 miles per hour) are sufficient as long as they are consistent throughout the house. An air velocity of 40 feet per minute can be barely felt by most people on bare skin. There is little added cultural benefits with high air velocities (over 100 feet per minute). High air velocities require larger fans that only waste electricity.

## Greenhouse Air Movement Methods

The Polytube System is one way in which air may be moved inside a greenhouse. A polytube system employs

*Continued on page 20*

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