

2. Air Circulators Versus Exhaust Fans by George B. Goddard

Function of Air Circulators -- Many growers have recently inquired about the use of the air circulators for cooling greenhouses. Air circulators are mounted in the middle of the greenhouse above the plants and provide a gentle circulation of air around the plants. They are not designed or intended for cooling greenhouses. Their principal use is to create more uniform temperatures throughout the greenhouses during winter when the ventilators are closed or only slightly open. If air circulators are run during the summertime, the temperatures within the greenhouse may possibly be even hotter than without any forced air circulation at all because they stir up the hot air near the ridge and force it down around the plants. This is due to the very slow velocity of air movement which air circulators create.

Air Circulators Equalize Temperatures -- If, during the winter months, it is found that the temperature in the various parts of the greenhouse is uneven, consideration should be given to installing air circulators. If they are properly installed, they will give more uniform temperatures throughout the greenhouse and provide a gentle air circulation even though the houses are completely closed. This is especially true when it is necessary to maintain very high temperatures. Some growers have had fair success just from using a regular fan which is suspended from the roof near the gable end of the house. Most growers who have used air circulators have found some reduction in heating costs.

Use Exhaust Fans for Cooling -- It is important to remember that air circulators are useful only during the fall and winter months to improve heating efficiency. If cooling is desired during the hot summer months, the use of exhaust fans and possibly pads is recommended.

Many growers have not put in fan and pad cooling because of the cost, and yet the excessively high temperatures that are encountered in their greenhouses prompt them to inquire each year regarding the use of various mechanisms to cool the greenhouses.

Temperature records indicate that we can expect day temperatures of 90° or higher within greenhouses during at least 80 per cent of the time during the summer months. This means that the outside temperature at this same time must be

at least 75 to 80°, or 10 to 15° cooler. According to weather records, temperatures in our area in a normal year outdoors will not rise over 90° more than 15 to 20 per cent of the time. Accordingly, some device which will maintain a greenhouse temperature equal to or only slightly above the outside temperature would be desirable.

Exhaust fans, properly installed, will maintain the greenhouse temperature approximately the same as the outside temperature. If greater cooling is desired, a person must consider the use of moist excelsior padding to decrease the temperature below the outside temperature. To determine the type of fan which is needed to get the desired amount of cooling, it is necessary to calculate the area of the greenhouse floor space and then multiply by 10. This will give the number of cubic feet of air per minute (CFM) that should be moved out of the greenhouse to provide a complete change of air each minute. Once the CFM has been determined, all that is necessary is to select a fan or fans that will handle this volume of air.

Many growers who originally installed fan and pad systems now only use the fans during extremely hot days and the pads are kept in readiness for prolonged heat spells.

In summary, then, air circulators are used during the winter months to improve heat efficiency and exhaust fans are used during the hot summer months to create a cooling effect in the greenhouse by removing the hot air.