Evaporative Cooling

Evaporative cooling pads are quite effective and useful in lower humidity climates but their use and value in Georgia depend on the crop and other factors.

Figure L4.5: The Influence of Air Exchange Rate on the Temperature Rise in Greenhouses.

RECOMMENDED GREENHOUSE HEATING-VENTILATION EQUIPMENT SPECIFICATIONS

Ventilation Fans
A.M.C.A. (Air Moving Conditioning Association) rated to provide required CFM at 1/10 to 1/8 inch static pressure. Totally enclosed motors, with ball bearings, thermally protected, direct or belt-drive, one or two-speed as required.

NOTE: Non-A.M.C.A. rated fans are not recommended but if used should be over-sized 35 to 50 percent to compensate for reduced air flow under static pressure operating conditions.

Shutters
Aluminum or enamel-painted steel frame, reinforced aluminum vanes tie rod connected, bronze or nylon pivot bearings, gravity or motorized wall type as required.

Unit Heater
A.G.A. approved vented type with aluminized or stainless steel heat exchanger. Propeller type fan with ball-bearing or permanently-lubricated continuous-duty sleeve bearing motor, thermal or impedance protected. Pilot with 100 percent safety shut-off controls, 115/24 V control transformer. LP or natural gas as required for fuel available. Heater to have Btu/hour output as required.

Heat Thermostat
24 V SPST heat-anticipator or line voltage type, temperature range approximately 50° to 80°F. Suitable for greenhouse dirt and humidity conditions. Mercury-bulb type to be firmly mounted to prevent movement and erratic heater operation.

Ventilation Thermostat
Heavy duty, snap action, line voltage type, amperage of Hp rating larger than fan motor, SPST or two-stage (2 SPDT switches) as required, suitable for greenhouse dirt and humidity conditions.

Evaporative Cooling Pads
Some evaporative cooling systems can cool air to 85 percent of the difference between its original temperature prior to cooling and the coolest temperature which could be achieved if the air were cooled to the dew point or to the point of 100 percent relative humidity.

Evaporative coolers are more effective when the humidity is low. Fortunately, relative humidities are usually low during warm periods. Solar heat entering the house offsets some of the cooling effect. A well designed ventilation system providing one air exchange per minute is essential for good evaporative cooling system.

Many pad materials have been successfully used for evaporative cooling. Table 4.11 gives recommended air flow through various pad type materials.