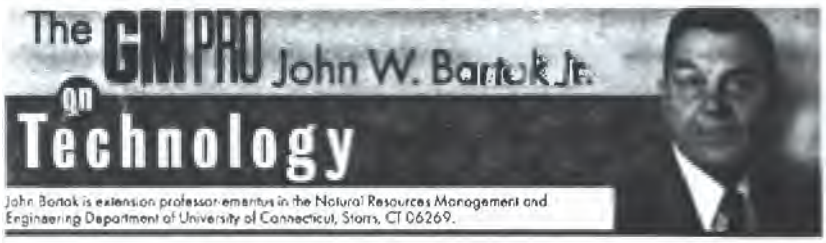

Root-zone heating can save energy by reducing needs

With fuel costs rising rapidly, root-zone heating is becoming popular to save energy. Supplying heat under a crop reduces its needs by allowing the air temperature to be maintained 5°F-15°F cooler. It also maintains a more uniform heat pattern than can be obtained with perimeter or unit air heaters.

Root-zone heat can be provided in the floor or under the crop on benches.

Root zone basics

The basic floor system consists of pipe embedded in a layer of sand or concrete. Warm water, pumped through the pipes, conducts the heat to the plants placed on the floor. The sand or concrete distributes the heat evenly across the floor surface.

In the bench system, aluminum fin pipes or bare steel pipes placed under the bench radiate heat up to the root zone. Another system uses rubber tubing or mats placed on the bench top under the plants.

Depending on climate, a root-zone heating system will provide 25-75 percent of the total heat needs of a greenhouse. The remaining heat need is usually made up with perimeter radiation or air heaters. Research has shown that about 15-35 Btu per hour per square foot of floor or hench can be obtained from a root-zone heating system.

To get good service from root-zone systems, they have to be installed correctly. Cutting corners usually doesn't pay, Here are a few installation techniques that may help.

Heat source

For heating areas less than 3,000 square feet, a low-cost, domestic hot water heater is usually the best choice. These are available in natural gas, propane and electric models in sizes to about 45,000 Btu per hour. Commercial water heaters with output to 300,000 Btu per hour can be used for larger areas.

Select a heater with a glass-lined tank. Gas-fired models frequently require only a plastic flue pipe rather than a metal or masonry chimney. The installation is simple in that besides the water heater all that is needed is an expansion tank, air eliminator, PTR valve, circulating pump and remote bulb thermostat. The thermostat on the water heater is usually set at 100°F to 110°F and