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86. Do's and don'ts for evaporative cooling pad systems. Fales, M. Greenhouse Management and Production 29(4):16, 18, 20. 2009.

By Mark Fales

Do's and Don'ts

for evaporative cooling pad systems

Proper sizing and maintenance can keep a greenhouse cooling system operating efficiently.

A fan and evaporative cooling pad system when properly designed, installed and maintained can produce up to 20 degrees of cooling. The system usually requires relatively little maintenance. To ensure the system runs as efficiently as possible, there are some do's and don'ts you should follow.

Match the system to the greenhouse

An evaporative cooling pad and fan system should match the ventilation requirements of the greenhouse. One way to determine those requirements is through measuring the static pressure. This allows you to measure how hard it is for the exhaust fans to pull air into a greenhouse. The higher the static pressure, the more the fans are operating to pull air into the house. If the pressure is too high, the amount of air the fans draw into the house is reduced.

A greenhouse equipped with exhaust fans and pads should operate at a static pressure between 0.07 and 0.10 inches when all the fans are operating. In order to assure that a greenhouse is operating at the proper static pressure, the appropriate amount of evaporative cooling pad must be installed to match the airflow of the ventilation fans. Fan performance can be reduced by failing to install a sufficient amount of evaporative cooling pad.

Eliminate air leaks

To receive the optimum performance from an evaporative cooling pad system, make sure that all of the air entering through the greenhouse opening passes through the pads. Any air that leaks through the system around the pads or through unsealed openings will not be properly cooled and will cause less air to move through the pads.

Maintain the cooling pads

The pads are durable and will last up to six years if prop-



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erly maintained. When the water is circulated and evaporated, the mineral content of the remaining water increases. To keep the mineral content within acceptable levels, 5-10 percent of the circulating water must be bled off. When mineral deposits are observed on the pads, increase the amount of bleed off.

The pH of the recirculated water must be maintained between 6 and 9. A pH higher than 9 or less than 6 drastically reduces the life of the pads.

Algae growth and bacteria in the water must be controlled.

While the pads are treated with a fungus resistant additive, this does not completely prevent algae growth.

To keep algae under control, treat the water with a chlorine algaecide (calcium hypochlorite) used for swimming pools, such as HTH or Pace. Tablet forms of these algaecides are the most economical and best to use in the sump for slow release. Maintain the sump water for recirculation at 1 part per million chlorine.

If a chlorine smell is present, too much has been added. If any algae grows, tablets need to be added.

Water pH and chlorine levels should be checked weekly. Kits for testing pH and chlorine may be purchased at any swimming pool supply store. Do not use copper sulfate in the system, as it will corrode the pump and other metal parts of the system.

The right amount of water

The pumps should be sized for the



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system to supply at least ½ gallon of water per minute per linear foot of pad system. The sump (tank) should be sized for a capacity of at least ¾ gallon per square foot of pad area.

A float valve should be used in the sump to control the filling of the sump.

The typical float valve used in an evaporative cooling system is similar to that found in a common toilet tank.

A ¾-inch supply line at 40 pounds per square inch connected to the float valve should provide the necessary amount of makeup water to keep

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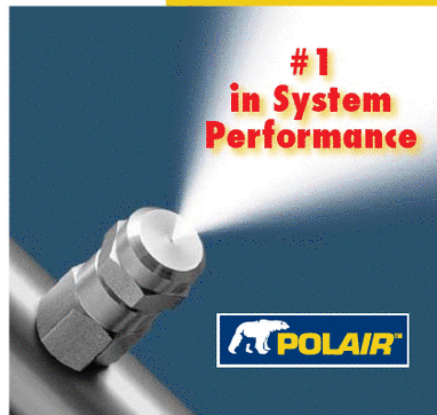
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the system running. This is the same amount of water in the typical backyard water hose.

System maintenance

It is important to clean the filter at least once a week, more often if foreign materials are present in the water system.

Flush the pipe distribution system at least once a month. This is done by opening both ball valves while the pump is running and allowing water to flow through and out of the system.

Regulate the ventilation system so that the pad system is turned off while all the fans are still running. This pulls air through the pads after the water is turned off, allowing them to dry properly and killing any algae spores.

Do not keep the pads constantly wet, as this causes the pads to become soft. The pads should be allowed to dry out once every 24 hours.

When the evaporative pad system is operating, check the pads for dry spots. When dry spots are observed, remove the pipe cover and check the holes in the delivery pipe. Clean any stopped up holes with a wire until adequate water flows from each hole.

Do not allow excessive amounts of water to flow onto the pad. The pads are more efficient if they receive just enough water to keep them wet, but not a stream of water cascading down the pad.

Drain and clean the sump as necessary to remove any dirt or debris that may have accumulated.

At the end of the evaporative cooling season, drain the pump, sump and pipe system to avoid freezing damage during cold weather.

When the weather turns warm and it's time to begin operating the cooling system, check for evidence of rodents in the trough. If rodents are present, remove them and clean up any mess they may have made. Check the filters, add water and the system is ready to start cooling again.

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