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Poultry Housing Tips

Fogging Pad Update

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This spring, tests were conducted in an evaporative-cooled wind tunnel facility to evaluate the effectiveness of different methods of wetting paper pads. The objective of these tests was to maximize cooling while minimizing water runoff. The temperature drop or cooling listed in the examples below is approximately the amount of cooling the different systems would produce on a warm summer day. The exact amount of cooling produced would change with weather conditions, pad area, etc. and thus the figures below should only be used for comparison purposes. These test results have been generally confirmed by field observations.

1) *To reduce the number of fogging nozzles as well as to minimize nozzle clogging problems, some producers have opted to use two rows of high-volume nozzles (3 gals/hr) instead of three rows of low-volume nozzles (1 gal/hr). Wind tunnel comparisons showed that the higher volume nozzles, even when fewer were used, produced more runoff than systems with low-volume nozzles without an increase in cooling.*

Type of Water Distribution System	Water Supplied to Pad per 100' of pad (gals/min)	Cooling (F)	Runoff per 100' of pad (gals/min)
Two rows of 3 gal/hr nozzles 16" on center (2" paper pad)	5.6 (100 psi)	9	2.6
Three rows of 1 gal/hr nozzles 16" on center (2" paper pad)	3.8 (100 psi)	9	1.5

Though it is true that runoff can be limited by using an interval timer, the tests confirmed field observations that the high-volume nozzles tend to produce significantly more runoff than low-volume nozzles. As discussed in previous newsletters, it is easier to manage fogging pad systems by turning off individual lines and changing line pressure than by using interval timers (*Managing Fogging Pad Runoff, May 1996*). Three rows of low-volume nozzles provide more operating options than two rows of high-volume nozzles. In this case, the bottom rows of nozzles could have been shut off on the three-row system, runoff reduced, and the cooling would have remained about the same. In a system with only two rows of nozzles shutting off one row of nozzles would have likely resulted in less uniform pad wetting and a reduction in cooling.

2) *Some producers have experimented with using soaker hoses instead of fogging nozzles to wet 2" paper pads. Wind tunnel tests confirmed field observations that soaker hoses can be used to wet the pad; however, they tend to produce less cooling and more runoff.*

Type of Water Distribution System	Water Supplied to Pad per 100' of pad (gals/min)	Cooling (F)	Runoff per 100' of pad (gals/min)
Three rows of 1 gal/hr nozzles 16" on center (2" paper pad)	3.8 (100 psi)	9	1.5
Soaker Hose (low flow)	5.6	7.6	3.8
Soaker Hose (medium flow)	9.8	8	5.8
Soaker Hose (full flow)	15	8.4	9.2

The problem with using a soaker hose is that it is very difficult to insure uniform pad wetting when water is dripped from the top of the pad unless a lot of water is used. For instance, on the typical 4" recirculated evaporative cooling system, approximately 75 gallons of water are circulated over the pad each minute for each 100 feet of pad length to insure adequate pad wetting and to help keep the surface of the pad clean. Of course, the gutter below the pad collects this excess water and recycles it. By using nozzles instead of dripping water from the top, less water is required to wet the pad. Fogging nozzles distribute the water evenly on the top, middle, and bottom of the pad, reducing the total amount of water needed by 80 percent or more. When lower water flow rates than those listed above were attempted using the soaker hose, the pad was wet in some places but remained dry in others as demonstrated by significant streaking on the pad. Since the entire pad was not properly wetted, cooling was reduced. Using a soaker hose on a 4" paper pad produced similar results.

3) *Some newly developed 4" fogging pad systems produce slightly more cooling and require less pad area than present 2" paper pad systems. The new 4" pads have flatter flute angles than traditional 4" pads (30^o X 30^o or 15^o X 45^o vs 45^o X 45^o) making it easier for the fans to draw air through them, and since they are thicker than 2" pads they tend to produce more cooling. Generally, a minimum of 60 square feet of 2" pad is required for each 48" fan (19,200 cfm); the new 4" pads require a minimum of 50 square feet per 48" fan (check with pad manufacturer for pad area recommendations).*

Type of Water Distribution System	Water Supplied to Pad per 100' of pad (gals/min)	Cooling (F)	Runoff per 100' of pad (gals/min)
Three rows of 1 gal/hr nozzles 16" on center (new 4" paper pad)	3.8 (100 psi)	9.6	1.3
Three rows of 1 gal/hr nozzles 16" on center (new 4" paper pad)	5.6 (180 psi)	10.8	1.7
Three rows of 3 gal/hr nozzles 16" on center (new 4" paper pad)	5.6 (40 psi)	11.8	1.9
Three rows of 3 gal/hr nozzles 16" on center (new 4" paper pad)	9.8 (100 psi)	12.8	4

Though 4" systems can produce more cooling than 2" systems it is important to keep in mind that there are some possible downsides to the increased cooling potential of 4" pad systems.

1) Since the 4" systems produce more cooling they will use more water
2) The increased cooling will result in higher house humidity. 1ºF cooling produced through evaporation will increase house humidity 3%.
3) 4" pads are more difficult to clean than 2" pads.
4) A 4" pad is more expensive per foot than a 2" pad.

The following suggestions for fogging pad systems are based on field observations made over the last couple of years.

1) *Fogging nozzles with exterior screens are much less likely to clog compared to those with interior (bowl) screens.*

   Though both plastic and stainless nozzles can be used to wet a pad, one nozzle characteristic that can have a dramatic effect on your ability to keep your birds cool during hot weather is what type of screen the nozzle has. There are basically two types of fogging nozzle screens, interior and exterior. Unlike interior screens (Figure 1), exterior screens extend into the water pipe making it easy to keep them clean (Figure 2). A ball valve can be installed in the end of the pipe opposite the water supply. When the pump is operating the ball valve can be opened allowing the water to quickly flow past the nozzle screens, cleaning them in the process. Furthermore, interior nozzle screens tend to have less surface area, making them more prone to clogging (Figure 1). **If you have water quality problems, nozzles with interior screens should be avoided.**

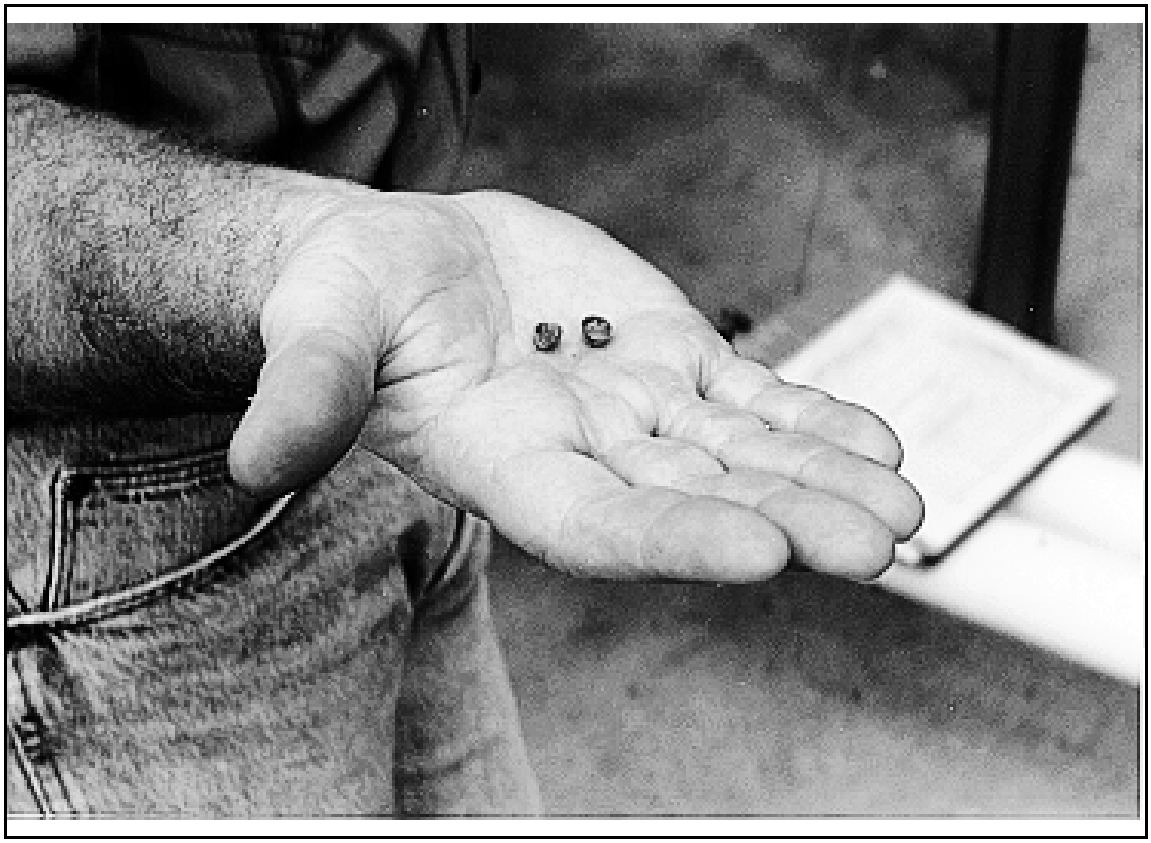

Figure 1. Fogging nozzle "Bowl" screens.

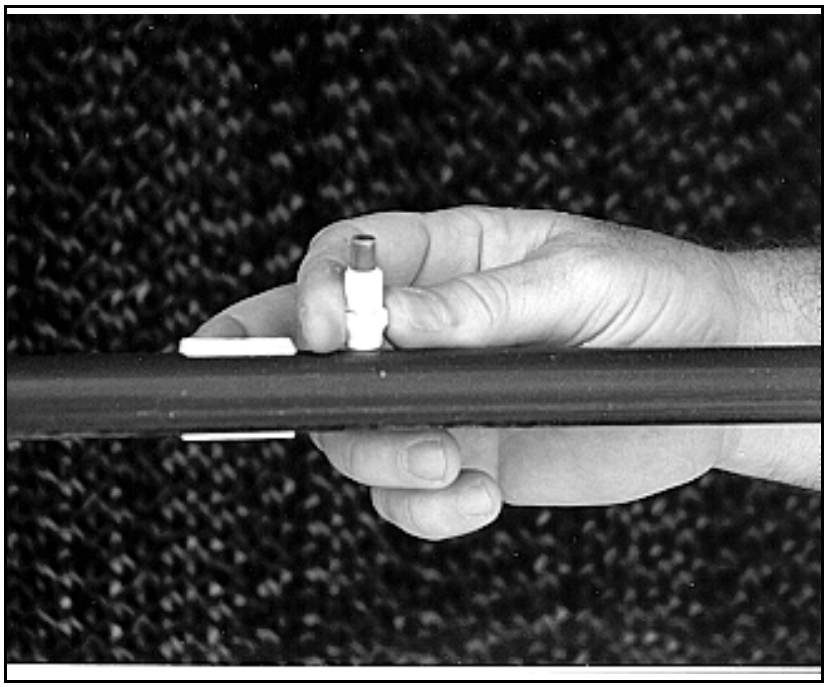

Figure 2. Fogging nozzle with exterior cylinder screen.

2) *Paper pads should be installed so that the bottom of the pad does not rest in the bottom of a water collection gutter.*

The gutter used to collect the water from the bottom of a fogging pad tends to hold water after the fogging pad system has turned off. If the bottom of a paper pad rest on the bottom of the gutter, it can remain wet 24 hrs a day, encouraging algae growth as well as weakening the pad. When a gutter is used, it is best if there is at least a 1" gap between the bottom of the pad and the bottom of the gutter to insure the bottom of the pad can dry off when the system is not in use. If your pad presently sits in the bottom of a gutter and the pad cannot be moved from the bottom of the gutter, you may want to drill some holes in the bottom of the gutter to insure the bottom of the pad can dry out.

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