

Cooling meat chickens with water sprinklers



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Sprinkling water directly onto the chickens in tunnel-ventilated sheds provides a cooling effect while using much less water than evaporative cooling pads. Water is applied automatically in short bursts, and then allowed to evaporate. This prevents the litter from becoming wet. Sprinkling water stimulates chicken movement that releases trapped heat, and encourages regular water and feed intake.

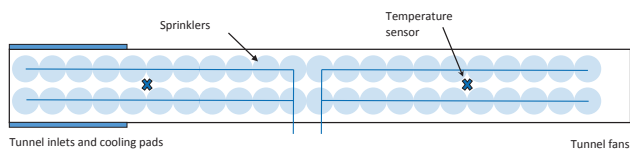
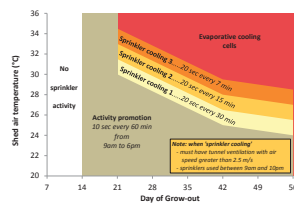
We wanted to see how comfortable the chickens were during warm weather, measure water use, see if there was an effect on litter conditions, and observe the chickens' reaction to the sprinklers.

Sprinkling vs evaporative cooling or fogging

- Evaporative cooling pads and foggers increase in-shed relative humidity to 80-85%, which slows litter drying and may make the chickens 'feel' warmer.
- The sprinkler control system turns the sprinklers on for short bursts (10–20 seconds) at regular intervals (5–60 minutes) depending on the time of day, day of the grow-out, and temperature.
- The litter does not get wet because the water applied during one application evaporates before the next application.
- Water sprinkled in the shed lands on the chickens and cools them by removing heat directly off their feathers as it evaporates.
- Sprinklers use less water than evaporative cool pads because they do not cool all of the air entering the shed. The cooling effect is directly on the chickens, not the building.
- Sprinklers delay the use of evaporative cooling pads, but evaporative cooling pads are still required in very hot conditions.
- Sprinkler systems are relatively cheap to install as a secondary cooling system.

What is a modern in-shed sprinkler system?

- 2-3 rows of low-pressure sprinklers are installed above the chickens. Sprinklers are divided into zones that operate independently. A temperature sensor is installed in each zone.
- The sprinkler system settings are adjustable. Farmers are able to choose when the sprinklers will automatically work and how much they want to rely on the sprinkler system for cooling.
- Once programmed, the sprinkler system works automatically to sprinkle water when it is required depending on the chickens' needs, weather & litter conditions.
- An optional 'activity promotion' setting regularly sprinkles water based on a timer, not temperature. This stimulates regular chicken movement and may help to settle dust.
- Low water pressure (275 KPa/40 PSI) creates large droplets that settle on the chickens. Water evaporating off the chickens removes heat.



Key findings

It takes time to integrate the use of sprinklers into a shed, and get it working with the existing ventilation system, before the full benefits of sprinklers can be realised.

Sprinklers were used on 2 meat chicken farms in Southeast Queensland. We observed an overall saving in water use of about 50%, compared to the use of evaporative cooling pads alone. Water savings were greatest during the warmer months. During mildly warm weather, the sprinklers were effective and no evaporative cooling was required. During very hot conditions, evaporative cooling pads were used.

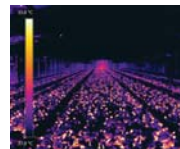
Farmers participating in the trial commented that the sprinklers would likely be beneficial during very hot weather by improving uniformity of cooling throughout the shed, and to stimulate chicken movement to release trapped heat.



Thermal image before sprinkling (without cool-pads)



Thermal image after sprinkling with 3 rows of sprinklers (without cool-pads)



Thermal image in a neighbouring cool-pad shed (Images taken on Day 40. Temperature and relative humidity conditions were: ambient 28.8°C, 65% RH; in sprinkler shed 27.8°C, 70% RH; and in neighbouring shed with evaporative cooling pads 24.5 °C, 87% RH)

How did the chickens respond?

The chickens responded calmly when water was sprinkled on them. The majority of the flock were observed to stand or access the feeders/drinkers for a short period.

What about the litter?

Litter moisture content was measured at 3-4 locations in each sprinkler shed, and compared with a neighbouring shed using evaporative cooling pads. Litter was not consistently wetter with the use of the sprinklers, and other factors affected litter conditions.

Future directions

We have confidence that sprinklers can be used safely and reliably in conjunction with existing ventilation and evaporative cooling pads. Further trials under controlled conditions will be necessary to evaluate the effect of the sprinklers on chicken growth, FCR and other production parameters.

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