

RRCI ANNUAL MEETING

March 5, 2007

Reflective Roof Coating Project Profile



What can chickens teach us about the benefits of keeping a roof cool?



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- **Introduction**
 - Highly reflective roof coatings have been proven to reduce roof surface temperature and interior temperatures of metal buildings.
 - Temperatures in poultry houses are kept at 85°F or lower, if possible.
 - In poultry production, high temperatures may affect feed consumption, weight gain, feed efficiency and mortality rate.
 - Energy costs can be the highest component of production costs for poultry growers.
- **Objective**
 - Use side-by-side buildings to measure the impact of a white reflective roof on interior temperature and efficiency of poultry production.



- **NCSU (North Carolina State U) collected data from roof temperature loggers provided by ERSystems.**
- **Duke Power installed separate electrical meters on each chicken house.**
- **Wm. Hammer farms provided records for weight of feed, feed efficiency, water consumption, weight of birds at sale, and mortality.**
- **Statesville Roofing applied the coating provided by ERSystems.**
- **Coordination by NCSU.**





- Each chicken house is 42' by 400'
- Each has 19,500 bird capacity.
- Cooling is accomplished by evaporation using fans placed into the walls/ends of the building.
- Evaporative fans are set on a thermostat at 85°F.
- Birds were placed into the houses on June 13, 2005 for a two month trial.





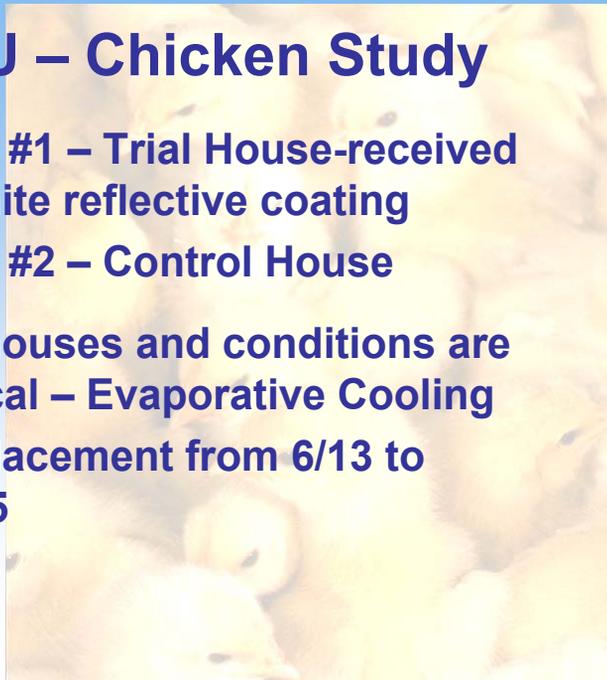
ER
SYSTEMS


Prairie
POULTRY

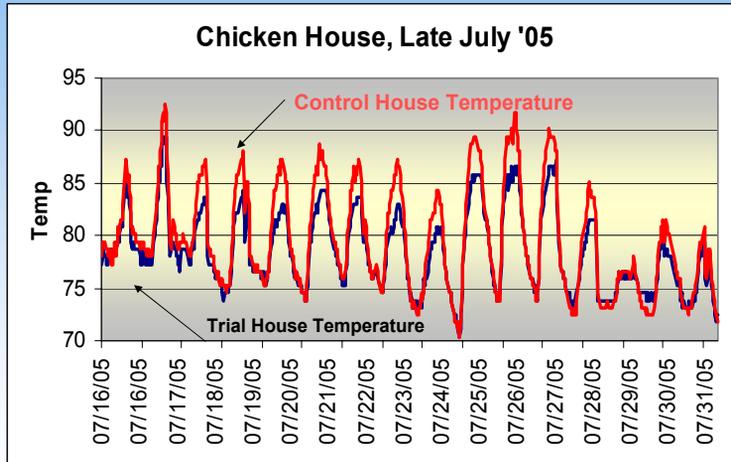
NCSU – Chicken Study

- **House #1 – Trial House-received the white reflective coating**
- **House #2 – Control House**
- **Both houses and conditions are identical – Evaporative Cooling**
- **Bird placement from 6/13 to 8/17/05**

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NCSU – Chicken Study



NCSU – Chicken Study

	House #1 Trial House	House #2 Control
Avg Daily Temp	79.75	81.90
Mortality (birds)	890	1238
Water Consumption (gallons)	24,810	22,701
Electrical Use (kWh)	5,731	10,053
Average Weight (lbs)	7.46	7.38



NCSU – Chicken Study

- Observations and results:
- Average daily temps varied by 2.15°F but daily high temps were consistently 4°F different, especially at peak demand times.
- Many days the Trial House never reached 85°F while the control did, so the evaporative coolers never kicked on at all—adding to the 43% electrical use reduction.
- Bird mortality is directly related to temperature/heat stress.



NCSU – Chicken Study

- Observations and results:
 - Mortality reduction of 28% (Valued at market price is \$620.50)
 - Electrical use reduction of 43% (Valued at \$477)
 - 9.2% more water consumed (+ health indicator)
 - 1% weight increase (not considered significant)
 - Total savings estimated at \$1,097.50
 - 5 cycles/house annually = \$5,487.50 savings
 - Cost of coating estimated at \$.90/sf = \$15,120 for a 16,800 sf chicken house
 - So payback in 2.75 years



NCSU – Chicken Study

CONCLUSION:

1. White reflective coatings applied to non-insulated or minimally insulated agricultural buildings may provide significant electrical energy savings in cooling heat-sensitive confined livestock, specifically poultry.
2. Highly reflective coatings may provide lower and more uniform interior temperatures, adding to livestock feeding efficiency and improved mortality.
3. The cost-benefit ratio for applying highly reflective coatings is very positive in this example.

