

## NOTES:

# The Effect of Drip Sprinklers on Sow and Litter Performance in a Subtropical Environment

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## INTRODUCTION

The environment has a large effect of swine performance. Both low and high temperatures can adversely affect performance in swine. Newborn pigs have a difficult time handling low temperatures (Curtis, 1970). The newborn pig requires air temperatures above 86° F (NRC, 1981). Sows start showing signs of heat stress when air temperatures are near 86° F (NRC, 1981). Because of this, it is difficult to regulate the farrowing house environment to meet the needs of both piglets and sows.

Heat stressed sows are likely to eat less feed. With a drop in feed intake, the sow's ability to produce milk is reduced which can adversely affect the performance of nursing piglets. Furthermore, reduced daily feed intakes can result in greater sow weight losses which can lead to rebreeding problems.

Fans and air conditioning systems can help to relieve heat stress in confined sows but they can also lead to chilling in piglets. Other methods of cooling swine, such as the use of drip sprinklers, have been explored in temperate climates (Bull *et al.*, 1997; McGlone *et al.*, 1988; Murphy *et al.* 1987). The effectiveness of drip sprinklers for cooling lactating sows in a subtropical environment should also be explored. Theoretically, drip sprinklers should lower the body temperature of sows through evaporative cooling. Drip sprinklers are relatively inexpensive to purchase and maintain compared to using air conditioning systems.

## MATERIALS AND METHODS

Our study was conducted at the University of Hawai'i at Hilo farm which has approximate latitude of 19.70 and an approximate longitude of 155.09. Sows assigned to this study were inseminated with fresh semen collected from boars at the university farm. Within five to ten days of the expected farrowing date, sows were weighed and moved into the farrowing house. At that time backfat thickness was measured using an ultrasound device on each side of the back approximately 1.5 inches off the midline at the last rib. The two backfat measurements were used to calculate the sow's average starting backfat thickness.

For a sow to be assigned to the study there had to be another sow of a similar breed make-up that would be farrowing within the same time period. One sow from each pair was randomly assigned to the drip sprinkler treatment while the other sow was assigned to the untreated, control group.

Each sow was randomly assigned to a crate in the farrowing house. Crates were equipped with plastic coated slotted wire flooring along with nipple waterers and sow feeders. Feeders were kept full of feed so that each sow could determine its own feed intake. For each feeder all feed additions and feed removals were weighed. Total feed intake and average daily feed intake during the 21-day lactation period were calculated. Under conditions of heat stress, sows could be expected to consume less feed. If the drip sprinkled system helped in cooling, the treatment sows could be expected to have higher daily feed intakes than control sows during periods of high temperatures.

The sprinkler system used in this study was a drip irrigation system as described by Murphy *et al.* (1987). A polyethylene pipe was installed over the farrowing crates. The water emitters were situated over the sows to wet the shoulder/neck area of the body. According to Murphy *et al.* (1987) this is the ideal location for wetting sows since there is a high blood flow rate in this part of the body. A thermostat and solenoid valve were used to turn the drip sprinkler system on and off based on air temperature. In the treatment group, drip sprinklers emitted water for one minute out of every 15 minutes when the temperature was 80° F or above.

At the time of birth, each litter was weighed to obtain their birth weight. When piglets reached 21 days of age, the litter and sow were weighed off of the study. Sow weight losses and litter weight gains were calculated. Sows frequently lose weight during their lactation period. High milk producing sows could be expected to lose more weight and produce heavier litters at weaning time.

Backfat measurements were taken again when each sow was weighed off of test at 21 days. The average ending backfat thickness was calculated for each sow. The difference between the ending average backfat thickness and starting average backfat thickness was calculated as the backfat thickness loss (or gain). Sows could be expected to have less backfat at the end of their lactation period since they often have to draw upon body stores (such as backfat) to produce milk. The amount of backfat lost during the study would depend upon the sow's daily feed intake and daily milk production.

## **RESULTS AND DISCUSSION**

This study included eight sows (four sows in the treatment group and four in the control group). Experiment results (means and standard errors) are shown in Table 1. Treatment and control sows did not differ significantly in daily feed intake, sow weight loss, or average backfat thickness loss. The air temperatures within the farrowing house seldom reached 80° F. Our drip sprinkler system was programmed to emit water when the temperatures reached 80° F. Because of this, the drip sprinkler system did not emit water on a frequent basis. Sows show signs of heat stress when air temperatures are near 86° F (NRC, 1981). Because of this, the sows included in our study were probably not experiencing heat stress. A sprinkler system would probably be of little or no value to sows that are not heat stressed.

In another study (Murphy *et al.*, 1987) drip sprinkled sows ate more feed and lost less weight during the lactation period than control sows. For that study the sprinkler system was programmed to emit water when the temperature was above 83° F. It would be expected that the drip sprinklers emitted water on a frequent basis in their study since the mean air temperature was 88° F. At 88° F, sows could be expected to benefit from a drip sprinkler system.

For our study, total litter weight gain and average daily litter weight gain did not differ significantly between the treatment and control group. Litter weight gains are affected by the amount of milk consumed. High milk producing sows can be expected to produce heavier litter weight gains. For our study, it would seem that treatment sows did not produce more milk than the control sows. This might be expected since the drip sprinklers were not beneficial to the sows included in our study.

## **ACKNOWLEDGEMENT**

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**Table 1. Sow and litter traits for drip sprinkled and control sows.**

Variable	<u>Drip Group</u>		<u>Control Group</u>	
	Mean	S.E.	Mean	S.E.
<u>Sow Traits</u>				
Weight loss per sow, lb.	19.8	28.3	6	8.1
Average backfat thickness loss per sow, in.	.074	.022	.039	.033
Average daily feed intake per sow, lb.	13.1	1.4	14.4	.6
<u>Litter Traits</u>				
Litter weight at 21 days, lb.	118	10.1	129	6.7
Litter weight gain over the lactation period, lb.	84.5	9.9	94.1	5.4
Average daily litter weight gain, lb.	4.1	.5	4.5	.2