

The Value of Water Sprinklers for Cooling Pregnant Sows During the Summer

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An experiment was conducted at the Fort Reno Experiment Station in the summer of 1956 to determine the effect of water sprinklers on the body temperatures of pregnant sows and their subsequent reproductive performance.

Procedure

In June, 41 gilts and yearling sows consisting of 17 Hampshires, 22 Duroc x Beltsville No. 1 crossbreds and 2 Durocs were divided into four lots for this test. The 28 gilts were divided into 2 equal lots on the basis of line of breeding and stage of gestation (the breeding season was from April 23rd to May 29th). The 13 yearling sows were also divided into two lots on the same basis.

Each of the four alfalfa pasture lots contained a 12 x 24 foot open shade with a galvanized iron roof six feet above the ground. The ground under the shades was covered with 6 to 8 inches of river sand. A single nozzle water sprinkler was installed under the shades for one gilt lot and one sow lot. Beginning June 15 these sprinklers were turned on about 8:00 a.m. each morning and turned off about 5:00 p.m. each afternoon.

Gilts and sows under the two treatments were hand fed equal quantities of the same ration twice a day. The sprinkled sows and gilts readily consumed the morning and afternoon feed immediately after it was placed before them. The non-sprinkled sows and gilts sometimes left the morning feed and frequently left the afternoon feed until sometime during the night. Their day's feed was always consumed prior to the next morning's feeding.

Rectal temperatures were taken on samples of 8 females from each of the two treatments at four weekly intervals beginning July 24th. Temperatures were taken between 1:00 and 3:00 p.m. and air temperatures under the shades were recorded at the same time. The air temperatures on these days ranged from 96 to 108 degrees F. (Table 1). The average body temperature for the sprinkled sows was 101.0 degrees (Table 2). It was rather consistent even with a 12 degree range in air temperature. The average temperature for the non-sprinkled sows was 103.8 degrees. The difference between sows on the two treatments was 2.8 degrees and highly significant. The body temperatures of the non-sprinkled sows and gilts tended to increase as the air temperature increased. There was no significant difference in the body temperatures of the gilts and yearling sows.

Table 1.—Air temperatures under shades when rectal temperatures were recorded.

Treatment	Date			
	July 24	July 31	Aug. 7	Aug. 14
No sprinklers	96.0	100.0	104.0	108.5
Sprinklers	96.0	100.0	101.5	104.5

Table 2.—Rectal temperatures of sows with access to shades with and without water sprinklers.

Treatment	No. sows	July 24	July 31	August 7	August 14	Av.
No sprinklers	8	102.7	104.2	103.9	104.6	103.8
Sprinklers	8	101.2	101.1	101.1	100.7	101.0
Difference		1.5	3.1	2.8	3.9	2.8 ¹

¹ P is less than .01.

Day difference is significant at the .05 level.

Results

As the individual sows in the different lots were due to farrow in August and September, they were taken to the central farrowing barn and all were treated alike after that time. There were no sprinklers in the farrowing barn but on hot days all sows were sprinkled several times during the day with a hose. Five sows and 12 gilts from the sprinkled lots and similar numbers from the non-sprinkled lots farrowed fall litters. Reproductive failures in the two treatments were approximately equal (4 and 3 in the sprinkled and non-sprinkled groups respectively).

One gilt from the sprinkled lot aborted on June 29th and one sow from the non-sprinkled lot aborted August 12th. One gilt and two sows from the sprinkled lots and two gilts from the non-sprinkled lots failed to farrow. These individuals were tested for Brucellosis and Leptospirosis and found to be negative.

The production of the 34 females (24 gilts and 10 yearling sows) is summarized in Table 3. The sows and gilts sprinkled during pregnancy farrowed 10.06 live pigs per litter as compared to 7.71 for the non-sprinkled sows and gilts. The difference of 2.35 live pigs was significant. The sprinkled sows and gilts also farrowed more total pigs per litter and their litters were heavier at birth but these differences were not statistically significant. The non-sprinkled sows and gilts averaged 1.53 stillborn pigs and .65 decomposed embryos as compared to .82 stillborn pigs and .06 decomposed embryos per litter for the sprinkled sows and gilts.

The sprinkled sows and gilts weaned 7.76 pigs per litter as compared to 5.71 for the non-sprinkled sows and gilts. The difference of 2.05 pigs per litter was highly significant. Similarly the difference of 85 pounds

Table 3.—Reproductive performance of sows that had access to shades with and without water sprinklers during pregnancy, 1956 summer.

Treatment of Bred Sows	Sprinklers	No Sprinklers	Difference
No. of sows	17	17	
Farrowing Data:			
Total pigs farrowed per litter	10.88	9.24	1.64
Live pigs farrowed per litter	10.06	7.71	2.35 ¹
Stillborn pigs per litter	.82	1.53	— .71
Decomposed embryos per litter	.06	.65	— .59
Litter birth weight, total pigs, lbs.	27.90	24.90	3.00
Litter birth weight, live pigs, lbs.	26.20	21.20	5.00
Weaning Data:			
Pigs weaned per litter	7.76	5.71	2.05 ²
Litter 56 day weight, lbs.	306.76	221.35	85.41 ²

¹ P is less than .05.

² P is less than .01.

in average litter weaning weight in favor of the sprinkled sows and gilts was also highly significant.

Other studies have demonstrated the value of cooling devices in promoting more rapid and efficient gains of growing pigs during the summer. The present experiment indicates that cooling the pregnant sow during the hot summer months may be even more important economically than cooling the growing pig. In hot weather the pregnant sow likely has more difficulty dissipating heat than a growing pig or an open sow. Therefore the benefits derived from cooling bred sows might be expected to be greater than from cooling fattening pigs. The differences in productivity of the sprinkled and non-sprinkled sows certainly support this view.

Cooling devices for sows and fattening pigs need not be expensive. Adequate shade over sand that can be wet down several times on hot days can be used to cool hogs. A fine mist spray nozzle over sand or concrete to prevent the formation of mud holes is a more satisfactory cooling device and is less time consuming than the procedure of sprinkling hogs under a shade several times each day.

During June, July and August maximum daily temperatures at El Reno averaged 96.3 degrees. During this period of 92 days the maximum temperature was above 90 degrees on 77 days. It is probable that the observed difference in the production of the sprinkled and non-sprinkled sows would not have been as great after a cool summer, but additional tests under different summer conditions are needed to determine the effect on production.