The elevated environmental temperature and humidity associated with summers in Virginia can severely affect swine reproduction. Breeding operations often experience a "summer slump" during which reproductive efficiency is greatly decreased. The adverse effects of "heat stress" are manifested in both the male and female. In this Livestock Update, I'll focus on the deleterious effects of elevated temperature on reproduction in boars and interventional management practices.

Effects of Elevated Temperature on Semen Quality and Libido in Boars
Acute exposure to high environmental temperatures reduces fertility in boars. Boars subjected to heat stress conditions produce ejaculates that have low sperm concentrations, high percentages of abnormal sperm cells (damaged acrosomes, proximal cytoplasmic droplets, etc.) and decreased percentages of progressively motile spermatozoa. Research has indicated that the minimum exposure time and critical air temperature above which production of sperm cells is adversely affected is 85º F and 72 hours, respectively.

The negative effects of acute heat stress on semen quality may be somewhat immediate. A "lag" period of approximately 2 weeks, however, is often observed between the initiation of acute heat stress and the first indications of abnormal sperm production. After the cessation of heat stress conditions, six to seven weeks is necessary before fertility returns to normal. Thus, acutely heat stressed boars can have a protracted, negative influence on reproduction in a breeding operation. For example, boars exposed to 95ºF temperatures for three consecutive days in late-July may be responsible for suppressed conception rates well into September, even in the unlikely situation in which temperatures do not rise above 85ºF after the July "heat wave."

In contrast to a number of experiments that focused on the effects of acute heat stress on fertility, little research has been conducted during which semen quality was assessed in boars chronically exposed to temperatures in the upper range of the thermo-neutral zone (79 to 84ºF). Boars are routinely exposed to these temperatures during the summer in southeast Virginia.

Researchers at North Carolina State University reported data obtained from seven commercial boar studs in southeastern North Carolina from June through October, when average weekly high temperatures at these facilities never exceeded 84ºF. Never the less, during this period there was a significant increase in the number of ejaculates rejected due to poor quality and a decrease in the number of insemination doses per ejaculate. The reduction in the number of insemination doses per ejaculate began 5 to 6 weeks after the weekly high temperature had stabilized at approximately 81ºF. Thus, boars may also be sensitive to chronic periods of moderately elevated temperatures not classically recognized as "heat stress" conditions.
The effects of elevated environmental temperature on various characteristics of libido have not been extensively studied. However, during the summer boars may become lethargic and display a reluctance or refusal to mount a sow in estrus or an artificial sow. Research has shown that boars subjected to heat stress conditions have decreased circulating concentrations of testosterone, which probably contributes to decreased libido.

**Management Considerations**

Diligent effort should be made to keep boars cool during periods of high environmental temperatures. The following are some key considerations for managers and herdsmen:

- If boars are pasture-reared, shade should be provided. Better yet is to provide a sprinkler system under a shade. Research conducted in Oklahoma and Florida revealed that boars maintained on outside lots with a shade and sprinklers had 20% higher fertility than those provided shade only.

- Managers of confinement units should verify that mechanical ventilation systems are properly serviced and operating in an optimum fashion. During hot weather, ventilation rates should be approximately 250 to 300 cubic feet per minute (cfm) per 300 to 500 pound boar.

- Thermostatically controlled sprinkler or drip systems allow evaporative cooling. Sprinkling is preferred to fogging, because fogging cools the air and the air must then cool the boar. Fog droplets also drift with air movement.

- Insulating the roof or ceiling of confinement units (14 to 25 R value) will minimize solar heat buildup in hot weather.

- Breeding extra sows and gilts to compensate for the lower conception rates expected during the summer is a common practice, but boars must not be overworked. When boars are used for natural mating during or after periods of high environmental temperatures, it is advisable to decrease the number of sows they service by approximately 30%.

- Feed boars and perform estrus detection and breeding early in the morning or late in the evening when it is cooler.

- Regardless of the type of housing employed, boars should always have unlimited access to fresh, cool water to drink. Minimum flow rates for nipple waterers should be 3 to 4 cups per minute.

- Observe boars regularly to determine if they are being heat-stressed. Producers can get an indication that boars are heat stressed by checking rectal temperatures or respiration rates. Normal values for mature boars are 101.1°F and 13 to 18 breaths per minute, respectively. Values appreciably higher than these are indicative of heat stress.