

## AI Boars and Heat Stress



### THE PROBLEM:

Heat stress in boars used for artificial insemination can take place any time of the year, although the problem usually occurs in the summer months. An obvious symptom of heat stressed AI boars is reduced quality of semen. This reduced semen quality will be displayed in a variety of ways, but the most prevalent is observance of sperm cells with a high incidence of cytoplasmic droplets. The problem occurs when the temperature of the testicles increases excessively and results in improper spermatogenesis or sperm cell development.

Individual boars react differently to heat stress. Some boars are prone to heat stress when the ambient temperature is as low as 83 degrees Fahrenheit while others do not exhibit semen quality problems until the temperature reaches 85 degrees Fahrenheit. When the temperature reaches 90 plus degrees Fahrenheit, virtually all boars are subject to the effects of heat stress.

Producers often associate heat stress only with summer heat. Boars can also become heat stressed in the winter. When a boar gets cold, he pulls his testicles toward his body. If the testicles remain in ascended position for an extended period, the testicular temperature becomes the same as the body temperature. Normal sperm cell development and maturation is optimized at a temperature slightly below normal body temperature. The function of the scrotum is to allow the testicles to be descended away from the body so they are kept slightly cooler than the body temperature.

### KEY TIPS FOR PREVENTION:

Boars should be kept as cool as possible in the summer months. When ambient temperatures reach 80 degrees, supplemental cooling is recommended. This can be accomplished with cool cells, foggers, or drippers. When using drippers, water should be directed to ensure complete coverage of the testicles. Some producers now utilize two dripper lines; one for the neck and the other for the testicles. However, water alone is not enough to keep boars from the effects of heat stress. Adequate amounts of air movement across the boars is required to allow for evaporative cooling and removal of body heat.

### RECOMMENDATIONS:

Most boars will respond to treatment for heat stress. The following recommendations have been effective in solving or reducing the effects of heat stress.

#### SEMEN PRODUCTION AND QUALITY

- If boars produce ejaculates with more than 25% proximal droplets, they must be rested for 3 weeks.
- If boars produce ejaculates with less than 25% proximal droplets and more than 25% distal droplets, they must be rested for 2 weeks.
- If an ejaculate is evaluated with more than 25% proximal and more than 25% distal droplets, the boar must be rested for 3 weeks. The key measurement to determine if boars should be rested is the proximal droplet evaluation rate of greater than 25%.
- Boars may not show full recovery within the initial rest period, particularly if they have been severely stressed. However, with additional rest the rate of observed abnormal cells will continue to decrease. For example: If a boar has 40% proximal droplets and 25% distal droplets when heat stress is first recognized, he must be rested for 3 weeks. If after 3 weeks of rest, the boar exhibits 10% proximal droplets and 40% distal droplets, he must be rested an additional 2 weeks. This additional rest period typically results in a return to normal semen quality.

- During the rest period the boars must receive proper nutrition designed for AI boars as well as a cool environment to allow for normal sperm cell development.
- Keep day-to-day QC records of randomly selected samples:
  - % Normal
  - % Motility
  - Total Sperm Per Dose (TSD)
- Calculate the lower 99% limit of each of these parameters.
- Is this limit greater than or equal to your contractual obligations? (i.e. if you promise 3 billion cells per dose, is the lower limit equal to or greater than 3B?) Make adjustments in your processing procedures to assure each dose meets your contractual parameters.
- Be able to demonstrate that each parameter does not fall below the lower 99% limit.
- Routine third-party assessment of randomly selected doses (minimum of 5 doses per assessment) of extended semen every 3-4 weeks provides feedback to the boar stud personnel, management and their production consultants on the current performance of the boar stud.
- NCG recommends a complete semen analysis that includes:
  - Dose volume
  - Sperm concentration
  - Total sperm per dose
  - Objective motility assessment
  - A full morphology differential
  - Aerobic culture
- Pack semen appropriately for the ambient temperature (non-route customers).
  - Consider checking their local next day high temps online in order to make proper packing decisions.
  - Consider the use of data shuttles for the purpose of recording temperatures during transit.

## **ENVIRONMENT AND TRANSPORT**

- For introduction of new boars during the heat of the summer, make any transport movements during the early morning hours. Consider culls as well until they reach market.
- Adequately train all incoming boars.
- Barn Sanitation
  - Routinely clean the barn with high pressure water.
  - Collection area sanitation.
    - Clean and disinfect all pens after each day's collections.
    - Clean and disinfect all mounting dummies after each day's collections.
    - Pay particular attention to the undersides of each dummy.
  - Review and monitor pre-collection boar cleaning procedures as boars are typically dirtier during the summer months.
- Maintain functioning cool cells and ventilation fans/controllers.
- If using dripper/mister systems be sure there is proper dry down time to avoid overheating the boars by being too wet.

Ultimately, it is then up to the boar stud manager and production team to implement management practices which will optimize the health, productivity and quality of sperm production from his boar stud herd. These strategies and consistent SOP's should extend from preparation and introduction of the boar into the herd, boar management, environmental management and quality control of the semen product.

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MG-2 12/09