The negative impact of heat stress on milk production is well known. In fact, heat stress accounts for roughly $900 million in losses on American dairy operations each year. As we continue breeding for cattle that are capable of producing higher volumes of milk, dairy cows will continue being highly susceptible to heat stress. However, milk production is not the only thing that suffers when temperatures rise – reproduction can suffer immensely starting around 77 °F.

**Are your customers taking the right steps to protect themselves from future reproductive losses?**

**Heat stress reduces the length and intensity of estrus**
- Motor activity is reduced (less mounting)
  - Holsteins in estrus during summer have 4.5 mounts vs. 8.6 mounts/estrus during the winter (Nebel et al. 1997)
- Silent ovulations are increased
  - At a dairy in Florida, undetected estrus events were estimated at 76 to 82% (79% average) during June through September (figure 1) compared to 44 to 65% (55% average) during October through May (figure 2) (Thatcher and Collier, 1986).
- Suppressed endocrine hormones: Luteinizing hormone and estradiol
- Heat stress impairs follicle selection and increases the length of follicular waves, causing:
  - Reduced quality of oocyte
  - Increase in the number of subordinate follicles
  - Dominant follicular growth suppressed
Improve Reproduction During the Summer

Heat Stress Influences the Developing Embryo and Spermatogenesis

- From day 1 to 7 after estrus, there is a reduction in quality and development of embryos
- Embryo growth up to day 17 post fertilization is inhibited by heat stress
- CL (corpus luteum) regression is blocked and pregnancy may be lost

Semen quality does not return to normal until 2 months after heat stress conditions, so putting problem breeders with these natural service sires after a period of heat stress can become ineffective

Adjust Reproduction Programs During Times of Heat Stress

Timed Artificial Insemination

Utilizing some type of timed AI protocol can improve fertility during the summer versus just breeding from observed estrus.

- Decrease days open
- Decrease interval from calving to first breeding
- Decrease services per conception

Examples of Timed AI protocols known to increase conception rate during heat stress periods:

- Ovsynch
- Cosynch72
- Ovsynch56

Use of GnRH on or After Estrus

Ovulation failure and undetected ovulations increase during heat stress

One possible way to curtail the lack of ovulation is the injection of GnRH at estrus (Ullah et al. 1996)

- An increase in conception rate from 18%-29% has been shown utilizing this procedure

Placental and Fetal Development

Heat stress during late gestation produces calves with lower birth weights and cows that produce less milk than cows not exposed to heat stress (Collier et al. 1982b)

Spermatogenesis and Heat Stress

Heat stress significantly impairs natural service sires, as it negatively affects spermatogenesis and libido:

- Decreased sperm concentration
- Lower sperm motility
- Increased % of abnormal sperm

<table>
<thead>
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<th>THI</th>
<th>55</th>
<th>56-59</th>
<th>60-64</th>
<th>65-69</th>
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<td>1%</td>
<td>2%</td>
<td>8%</td>
<td>12%</td>
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</table>

Table 1
Improve Reproduction During the Summer

Use of radio frequency data communication system, Heatwatch, to describe behavioral estrus in dairy cattle. J. Dairy Sci. 80 (Suppl.1):179. (Abstr.)


Works Cited