University Extension
UNIVERSITY OF MISSOURI COLUMBIA

Drought Information

College of Agriculture
Extension and Agricultural Information, 1-98 Agriculture Bldg., Columbia, Mo. 65211, (314) 882-8237

June 9, 1989

Effects of Heat on Breeding Bulls

John W. Massey, Department of Animal Science

Prolonged high temperatures of 100°F for 12 hours or more over a 72 hour period can reduce bull fertility.

According to literature in the Journal of Animal Science by Austin, Vol. 20, No. 2, p. 307, May, 1961, he quoted some work of Hafez in 1959, Lagerlof in 1934, Cassidy in 1952, and Parrish in 1958, dealing with ambient temperature on bull fertility.

Lagerlof reported increased abnormal sperm from 10 to 40 days after a 4- to 9-day scrotal insulation of three bulls land also showed temporary abnormal sperm with temporary sterility of four months duration in two bulls insulated from 11 to 16 days.

Cassidy in 1953 reported sterility (following a 17-day exposure to 100°F ambient temperature in a heat chamber) for at least 100 days duration in one bull and reduced semen quality in the second bull. He also stated that continuous exposure of a mean temperature of 86°F for 36 days also produced sterility in one bull and reduced semen quality in another.

Austin in 1961 reported that a lower level of sperm production accompanied by lower fertility rate generally occurs in the hot summer months. He showed that in a controlled experiment where a single exposure of beef bulls for 12 hours to a 104°F chamber resulted in decreased motility of spermatozoa, a decreased percent of live sperm, and an increased percent of abnormal sperm in each ejaculation. This agrees with similar results where the scrotum of bulls was insulated to prevent normal heat loss. Hafez data showed that those bulls exposed to high ambient temperatures for 12 hours showed about a 60 percent decrease in live sperm concentration as compared to the control.

When scrotal skin temperature was raised 3°F for 24 hours, the live sperm started decreasing in one week and peaked at two weeks with only 60 percent of normal live sperm. The bulls required six weeks to return to normal. There were 12 Hereford bulls involved in this study ranging from two to six years of age. He also reported that sperm motility decreased during the period with increased abnormal and dead sperm while sperm concentration in bull testicles insulated 72 hours decreased significantly during the fourth through the seventh week. The 72-hour results were very similar for scrotal insulation as reported by Parrish for ionized radiation when looking at injuries of semen quality, but of shorter duration. The radiation effects are on spermatogonia while insulation for high temperature effects are more pronounced in the maturing stages of sperm development.

Past years when we have had extended hot period we have had a higher percentage of bulls dropping out on semen test for fall sale, especially if they are evaluated about the middle of August for the November sale. If we can get back to normal temperatures by the last third of July many of the bulls which may fail their semen test in August may be satisfactory toward the first or middle of October since the time span will be about what was observed in these research trials.

You may want to stress the importance of a pregnancy check on cows, especially for those producers who have backed their calving up to April, because these are the ones that will be affected most with high temperatures since they are bred during month of July.