

EFFECTS OF HEAT STRESS ON EARLY  
EMBRYONIC DEVELOPMENT IN THE BEEF COW

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Elevated environmental temperatures have been related to lower conception rates and reduced calf production in the beef cow. Various studies with other species such as the pig have demonstrated that high temperature and humidity result in greater embryonic mortality, but possible factors involved in increasing mortality have not been established.

The objective of this study is to determine the effects of heat stress during early pregnancy in the beef cow on hormonal changes, embryonic development and embryonic survival. Thirty-eight cycling mature beef cows will be maintained and observed for estrus. Estrous cycles will be synchronized (Lutalyse, Upjohn) in cows for group mating (4/group) to Hereford and Angus bulls. Three days following mating, cows will be transported and placed in environmental chambers, maintained at 70 F and relative humidity of approximately 40% until day 8, when they will be assigned (15/treatment) to either remain at 70 F and 40% relative humidity (control treatment) or be exposed to 97 F and 40% relative humidity (heat stress treatment). Eight cyclic cows (nonbred control) will be maintained at 70 F and 40% relative humidity throughout the treatment period. Nonbred controls are included in the study so that comparisons of the hormonal and uterine changes during embryonic loss in heat stress cows can be compared to nonbred and pregnant nonheat stress cows. Treatments will continue until slaughter on day 17 of pregnancy. During the study, cows will be bled once daily via a jugular cannula from day 7 until slaughter to evaluate hormonal changes during heat stress. Following slaughter the reproductive tract will be removed, placed on ice, brought to the laboratory and flushed with physiological saline to recover the blastocyst and secretory products produced by both the uterus and blastocyst.

Completion of this study will indicate whether heat stress during early embryonic development has a detrimental effect on blastocyst development and survival in the beef cow. Analysis of the hormonal and uterine changes during this period may indicate possible factors related to embryonic development and maintenance of pregnancy in the beef cow.

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