Repro Tracks

by **Cliff Lamb,** *University of Florida*

Stress and reproduction

One of this month's themes for the* Angus Journal *is "Fall Processing." This topic brings to mind a frequent series of questions I receive regarding the impact of animal handling or stress on pregnancy rates. In cattle circles, we often use the word temperament to define the fear-related behavioral responses of cattle when they are exposed to human interactions, such as handling or during feed delivery.

Temperament

As temperament becomes more excitable to human contact or any other handling procedures, we tend to believe that those same animals have a greater degree of stress. In recent years, some interesting data have arisen with regard to temperament, and many producers select cattle for temperament primarily for safety reasons. However, cow temperament may also have productive and economic implications to beef operations. Hopefully, addressing a few questions that I have received will explain the interactions between stress and reproductive performance.

What is stress?

The stress response is defined as the reaction of cattle to internal and external factors that affect their well-being. Animals that are unable to cope with these factors are classified as stressed. Examples are extreme temperatures, diseases and injuries.

How are excitable temperament and stress related?

An aggressive response expressed by cattle with excitable temperament when exposed to human handling can be attributed to their fear and consequent inability to cope with the interaction, classified as a stress response. Temperamental cattle may also experience changes in their body physiology, and the hormones produced during this fear-related stress reaction influence several production-related outputs, such as growth, health and reproduction.

What factors affect temperament in beef cattle?

Temperament that results in a stress response is primarily affected by breed type and production system, but sex, age and horn status also are associated with stress. Producers in the southern part of the United States are well aware of the heightened temperament of *Bos indicus* cattle compared to those of *Bos taurus* origin. In addition, more intensively managed cattle tend to have calmer temperament scores than those reared on extensive systems. Similarly, older cattle are less temperamental than younger cattle, males are less temperamental than females, and horned cattle are less temperamental than polled cattle. There are obviously other factors that contribute to temperament, but these are certainly the primary factors.

How are stress and reproduction related?

Animals that have heightened temperament generally have decreased feed intake compared to their cohorts that are less stressed. These cattle partition nutrients differently and have altered metabolism so that they can sustain their behavioral stress response, which results in further decreases in nutrient availability to support body functions. Since nutritional status largely determines reproductive performance in cattle, excitable temperament impairs reproduction in beef heifers and cows by decreasing nutritional balance.

A second impact of increased stress is related to the hormones produced during the stress response. One hormone, cortisol, is a steroid hormone that is increased in animals under stress. Cortisol, along with other hormones, disrupts the physiological mechanisms that regulate reproduction in

CONTINUED ON PAGE 93

CONTINUED FROM PAGE 90

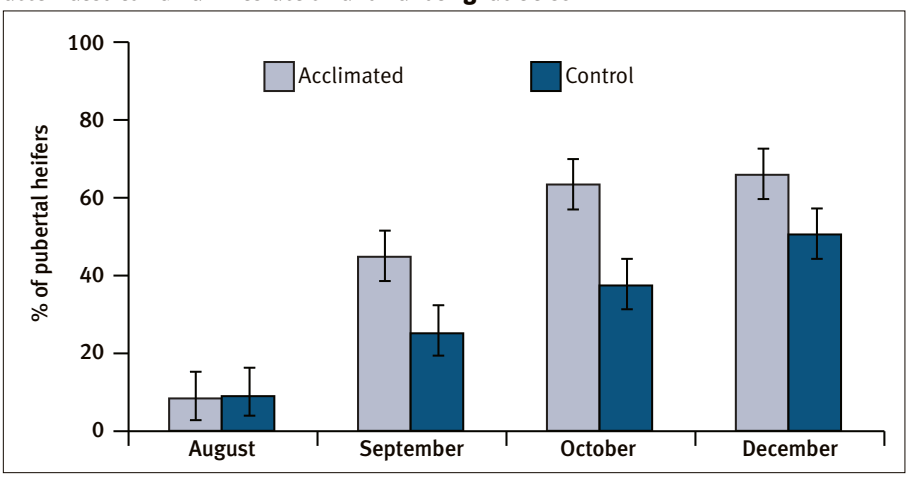
beef females, such as ovulation, conception and establishment of pregnancy.

One research study has demonstrated that cows with calm temperament have reduced cortisol and greater blood concentrations of luteinizing hormone (LH), the hormone required for puberty establishment and ovulation, compared to temperamental cows.

Recently, in another study, it was demonstrated that beef heifers with calm temperament reached puberty sooner than temperamental cohorts, and when acclimating prepubertal heifers to humans and handling facilities, a greater percentage of heifers attained puberty earlier than those heifers not acclimated to facilities (Fig. 1).

Therefore, management strategies that improve the overall temperament of the herd will benefit the reproductive performance and consequent productivity of cow-calf operations. Adapting beef females to human interaction early in their productive lives may be an alternative to improve their temperament and consequently hasten their reproductive development. Including temperament in culling/selection criteria is an important component to improving the overall temperament and consequent reproductive performance of the adult cow herd.

Fig. 1: Percentage of heifers attaining puberty after being acclimated or not being acclimated to human interaction and handling facilities



Source: Adapted from Cooke et al., 2009.

EMAIL: gclamb@ufl.edu

Editor's Note: *Cliff Lamb is a beef cattle specialist for the University of Florida and coordinator of the Florida Bull Test.*