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Topic Summary: Examining Novel and Acute Stressors in Cattle

Within cattle species, fear is a common emotion that is brought about more strongly within novel situations (Grandin, 1997). Stressors such as restraining systems, unfamiliar handlers and unfamiliar objects can all trigger intense panic reactions for cattle (Grandin, 1997). It only takes a few seconds for cattle to become excited but it takes 20 to 30 minutes for their heart rate to return to normal (Grandin, 1997). Thus, mitigating stressful events and raising more stress-tolerant animals is essential to the well-being of cattle.

One factor that could determine whether a cow is more tolerant to stress or not is the early developmental environment in which cattle are raised in (Waiblinger et al., 2005; Viera et al., 2015). A preliminary depictor of cattle response to fear or stress is the human-animal relationship fostered through early handling experiences. Waiblinger et al., (2005) recorded cattle handling conditions for the various farms and cross-examined that with cattle performance on novelty tests such as the Human Test Approach and the Novel Object Test. Waiblinger et al., (2005) found that cattle originating from farms with rough handling, exhibited panicked behaviors such as social licking during novelty tests. Another early influence of stress stems from a cow's social environment. Vieira et al., (2015) conducted an experiment that involved raising cattle in different home pen environments including paired versus individual housing. Vieira et al., (2015) then introduced these cattle to an unfamiliar calf to compare behavioral differences among the groups. Individually housed calves were found to be more reactive than pair-housed calves due to anxiety caused by isolation (Vieira et al., 2015). This study is significant as the typical practice is rearing calves individually (Vieira et al., 2015). Future research could look at the long-term effects of the early social environment and if it can their effects on stress can be reversed via social experience later in life (Vieira et al., 2015).

While the early housing and social environment may depict a large portion of a cow's response to novel stimuli, there are numerous methods that a handler can follow to mitigate panic behaviors. A cow has 5 senses and an individual interacting with them will primarily interact through sight and hearing (Kammel et al., 2019). Kammel et al., (2019) gathered intel on how cows need to be able to see the handler at all times or they will stop and look around to determine where the person is. Kammel et al., (2019) further expressed that the best position to allow the cow to see the stock person is at their side. Handlers should also keep in mind that, cows have a broader hearing spectrum than humans and will respond to frequencies that humans can not perceive (Kammel et al., 2019). Kammel et al., (2019) discusses that cows have a similar negative response to shouting as they do to hitting so handling practices should be designed to avoid clanging and banging, and all equipment should be engineered to be quiet.

In order to better understand behavioral stress in cattle and ensure their well-being following novel stimuli, both behavioral and physiological measures must be assessed (Grandin, 1997).

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When panicked, cows show increased behavioral responses characterized by increased exploration, arousal as well as behavioral conflict (Herskin et al., 2004). To develop a new way to test fear, researchers Hubbard et al., (2019) introduced the Bovine Zero Maze to observe the number of steps taken within the maze which can be decoded to offer reliable information about cattle fear behaviors. Researchers such as Mackay et al., 2014 and Hemsworth et al., 1996 used the Human test approach which is a fearfulness test shown to reflect underlying traits that affect a cow's spontaneous behavior (Mackay et al., 2014). Observations regarding the time and distance it takes to approach the experimenter along with physical interactions such as biting and licking were observed (Hemsworth et al., 1996). As for measuring physiological responses to stress, measuring cortisol levels in the blood or urine following a panicked response is an effective method (Chen et al., 2015). Researchers Chen et al., (2016) found that after a stressful event, stress-tolerant individuals will show lower levels of cortisol while excitable cattle will have higher amounts of cortisol.

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