

Annotated articles: 10

Topic Summary:

Tongue rolling in cattle is considered an oral stereotype. It's a reoccurring behavior which involves opening the mouth and flicking the tongue outside to perform rapid movements. These movements vary in terms of intensity, frequency, and direction (Biven 2020). Scientific inquiry into this behavior occurs through scan sampling observations of cattle in farm settings, blood analysis, and literature reviews. A common practice in this field is the collection of historical data for the cattle. This allows researchers to accurately assess changes during the studies, and if there are preexisting factors that influence the behavior.

In their systematic review, Ridge et al. 2020 found that tongue rolling can impact anywhere between eight% to 13.33% of cattle between six months and six years of age. Biven 2020 determined that tongue rolling is most prevalent in female cattle between the ages of 13-25 months, and least prevalent in cattle older than 25 months.

Studies of this behavior have found that tongue rolling is the result of a variety of factors such as diet, restricted time on open pastures, care in small places, lack of variety in environmental stimuli, and stress (Phillips 2008). The common theme is that tongue rolling behavior may be caused by frustration and stress when the animal is unable to meet their behavioral needs (Seo et al. 1998).

Theories of dietary contribution to tongue rolling behavior assume that dietary frustration causes changes in rumen (digestive organ) environment which results in tongue rolling behavior. This effect is noticeable in confinement, especially in small spaces (Biven 2020). Diets fed in confinement are larger, less frequent, higher in grain, and contain less roughage compared to a pasture. Confinement reduces rumination time compared to a pasture, which means that there is inadequate fulfillment in the cattle's digestive behaviour (Bergeron et al. 2008). Other dietary factors such as ingredient type, Particle size, and mineral addition yielded inconclusive results in altering tongue rolling behaviour. These factors to tongue rolling require a larger amount of research so that conclusive results can be obtained (Biven 2020).

Another line of thinking focuses on frustration due to a lack of movement/boredom. Cattle raised in a pasture environment in which they could move freely exhibited decreased tongue rolling behavior (Biven 2020). Care in confined space greatly decreases the movement of cattle which may create frustration and boredom, leading to tongue rolling.

Researchers have also examined whether tongue rolling is indicative of changes to physiological factors. It appears that parameters such as weight gain, reproductive success, rectal body temperature, respiratory rate, and rumen movement are not indicative of this behavior (Biven 2020). However, changes in physiology related to stress show links to tongue rolling.

Redbo 1998 and Webb et al. 2016 investigated whether stress is associated with cattle frustration and tongue rolling by examining cortisol (stress hormone) levels in young cattle.

They found that only under low feed levels, tongue rolling was linked to higher cortisol levels. They hypothesized that the environment (feed level) causes differences in gene expression which influence the behavior. Through reviewing these studies, it's clear that further research can be done to study the specific differences in gene expression between cattle exhibiting the tongue rolling behavior vs those that do not.

It was also found that injecting tongue rolling cattle with haloperidol (a drug that inhibits dopamine receptors) completely gets rid of the behavior (Sato et al. 1994). This suggests that stressful conditions and frustration may act upon the dopamine hormonal system in cattle to increase tongue rolling behavior. Also, Seo et al. 1998 determined that tongue playing has a de-arousal function as it decreases heart rate. This further supports the idea that stereotypies such as tongue rolling are used as a coping mechanism against stress (which is known to increase heart rate).

Tongue rolling behavior may be an important indicator of cattle welfare, specifically the frustration level and stress of the animal. Phillips 2008 suggested that welfare of the animal is compromised if it spends about ten% of its time tongue rolling. Farmers may use this value as an indicator to adjust care. Overall, this review brings forth the idea that cattle welfare may be improved (as indicated by decreased tongue rolling behavior) in a pasture environment.

References:

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