

# Environmental Influences on Crib-Biting Behaviour in Horses (*Equus caballus*)

## Topic Summary:

Crib-biting is an equine (*Equus caballus*) stereotypic behaviour. During crib-biting, a horse grips a surface with its incisors and pulls backward while sucking air into its esophagus (Wickens & Heleski, 2010). Crib-biting is often preceded by licking or chewing the surface (Whisher *et al.*, 2011). Free-ranging horses are not known to exhibit the behaviour, and the estimated prevalence of crib-biting in captive horses varies depending on the population surveyed (Wickens & Heleski, 2010; Bachmann *et al.*, 2010). Crib-biting horses are highly motivated to perform the behaviour and often spend large amounts of time crib-biting (Wickens & Heleski, 2010; Bachmann *et al.*, 2003). Crib-biting is associated with gastrointestinal issues, including low gastric pH, ulcers, and life-threatening gastrointestinal distress called colic (Escalona *et al.*, 2014; Patiño *et al.*, 2020). There is no clear evidence that crib-biting causes these issues, and a shared underlying cause may cause the association, or crib-biting may be a coping method for gastric pain. While the exact function of crib-biting is unknown, stereotypic behaviours are believed to indicate compromised welfare and may be an adaptive response to a deficit in the captive environment (Cooper & Albentosa, 2005).

Crib-biting is generally observed visually live or by video (Wickens & Heleski, 2010). Most studies on crib-biting fall into two categories; large-scale observational studies analyzing questionnaire data to identify associations between environmental factors and crib-biting, and experimental studies examining the response of crib-biting horses to a stimulus (Wickens & Heleski, 2010).

Experimental research demonstrates a possible association between stress and crib-biting, with crib-biting horses exhibiting differences in heart rate variability, potentially indicating greater stress sensitivity (Bachmann *et al.*, 2003). Further research into this area is necessary, as physiological stress studies often conflict, possibly due to the use of different stressful stimuli (Wickens & Heleski, 2010; Bachmann *et al.*, 2003). Crib-biting does not appear to be an acute stress response, as the crib-biting rate did not increase when horses experienced short-term stress (Bachmann *et al.*, 2003). Horses may be more vulnerable to developing crib-biting during stressful periods. An epidemiological study by Waters *et al.* (2010) found that horses are at greater risk of developing crib-biting during the stressful weaning period. Most stereotypic behaviours developed during the first nine months of life, and abrupt weaning increased the chance of developing stereotypic behaviour (Waters *et al.*, 2010). Observational studies consistently find that a lack of social contact increases crib-biting (Bachmann *et al.* 2010; McGreevy *et al.* 1995; Waters *et al.* 2010). Additionally, horses weaned in a mixed group of conspecifics were less likely to develop crib-biting (Waters *et al.* 2010).

Studies find a clear association between crib-biting and feeding. Feeding concentrates such as pre-formulated feed increases crib-biting (Bachmann *et al.* 2010; Waters *et al.* 2010). Foals fed concentrates post-weaning had a four times greater risk of developing crib-biting (Waters *et al.*

2010). Additionally, horses fed sweetened concentrates cribbed at a higher rate than those fed unsweetened concentrates (Whisher *et al.*, 2011). Conversely, feeding forage such as hay more often and in greater amounts decreases crib-biting (McGreevy *et al.* 1995). Temporary prevention of feeding and crib-biting increased cortisol levels and decreased gut motility in crib-biting horses, whereas prevention of crib-biting alone had no significant effects (McGreevy & Nicol, 1998). This finding may indicate that horses compensate for an inability to crib-bite by feeding and that both crib-biting and free access to food are necessary for normal digestion in crib-biting horses.

Environmental changes are superior to other preventative methods at reducing or stopping crib-biting (McGreevy & Nicol, 2010). Physical and surgical preventatives may lead to alternate forms of crib-biting, new behavioural issues, or adverse health impacts (McGreevy & Nicol, 2010). Environmental enrichment with feeding toys mostly fails to reduce crib-biting (Whisher *et al.*, 2011). Due to this, enriching the environment by increasing forage and social interaction may prevent or mitigate crib-biting most successfully. Carers should also take particular care with the management of foals during weaning.

With critical environmental factors affecting crib-biting identified, future research would do well to focus on why these factors, primarily feed type and social interaction, impact crib-biting. Further epidemiological studies could better uncover the origins of crib-biting rather than factors affecting horses already exhibiting crib-biting.

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