

ZOOL 567: Animal Behaviour: Independent Research Literature Review, Part 3

Topic Summary

One of the most prominent behaviours of the American bison (*Bison bison*) is their dustbathing or “wallowing” in loose soil (Coppedge & Shaw, 2000). Wallowing consists of several different behaviours. The most common is when the bison lie down and roll repeatedly on their sides (McHugh, 1958). There are many proposed reasons as to why bison might engage in wallowing. These include: (1), that wallowing is a grooming behaviour associated with shedding, supported by evidence that wallowing occurs more frequently at the time of shedding between April and September (Reinhardt, 1985). (2), That wallowing is associated with group cohesion, as it has a contagious effect and helps synchronize herd activity rhythms (Reinhardt, 1985). (3), That wallowing is associated with male-male interaction, as males wallow more than females, and that male wallowing increases during the breeding season with increased competition for mates (McHugh, 1958; Lott, 2002). (4), That wallowing is a play behaviour, often observed during play between young bison (McHugh, 1958), and (5/6), that wallowing occurs to provide relief of skin irritations from biting insects and ectoparasites, evidenced by the alignment of wallowing frequency with biting insect, and tick larvae abundance (McMillan et al, 2000; Mooring and Samuel, 1998). Despite not knowing the primary reason for why bison partake in wallowing activities, there are other aspects of wallowing that we do know.

Many visual observational studies have found that wallowing frequency varies depending on the sub-class of bison. Bulls (male bison) have been found to wallow more frequently than cows (female bison) (McMillan et al, 2000; Reinhardt, 1985; Caboń-Raczyńska et al, 1987; Coppedge & Shaw, 2000). Along with the differences seen between sex, the age of bison also correlates to wallowing frequency. Studies by Reinhardt (1985) have determined that adult bison (3 years and older) wallow more frequently than juveniles (2 years and younger). Sub-adults (2-3 years old) also wallow more frequently than juveniles. No difference in wallowing frequency between adult and sub-adult bison has been found. It has been hypothesized that this difference may occur due to the dominance hierarchies of bison herds (Reinhardt, 1985). Despite these differences between sub-classes of bison, all bison prefer similar landscape conditions to wallow in.

Few landscape studies, and their effects on bison herds have been performed, however, one study by Coppedge & Shaw (2000) studied American bison and the components of the landscape they interact with the most. Through visual observation, the study determined that bison prefer to wallow in areas with exposed soils, with a preference for areas where fall and summer burning events had taken place (Coppedge & Shaw, 2000). Another preference was wallowing in areas that were relatively level. Another finding from this study was the importance of bison wallows in prairie ecosystems. A bison’s habit of wallowing opens up new patches of Earth for seeds and sprouts as well as animals to create burrows in, increasing habitat diversity (Coppedge & Shaw, 2000). Bison also alter woody vegetation distribution due to their horning and rubbing grooming behaviours (Coppedge & Shaw, 1997) and because of this, American bison are considered a keystone species (Coppedge & Shaw, 2000).

The time of year that wallowing is observed is important in determining the primary cause of this behaviour. During the summer, male and female bison come together for the mating season. The rest of the year, male bison form separate herds from the females and calves (Mooring et al, 2006). Although this separation occurs, a study by McMillan et al. (2000) found that the annual frequencies of wallowing peaked in the months of July and September for all bison. Daily observations also determined that wallowing frequency was highest in the afternoon, compared to the morning and evening (McMillan et al, 2000). With these findings, the primary cause of bison wallowing has most recently been suggested to be for relief of skin irritation caused by biting insects, as the annual and daily cycles of wallowing align with the annual and daily cycles of abundance of biting insects (McMillan et al, 2000).

There was a time in history when bison almost went extinct. Today, it is important that we learn about their behaviours and ecological needs to prevent a similar event from happening again.

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