

Eunice Hermanto
ID #30093529
Dr. Summers
Zool 567
December 2, 2021

The grazing behaviour of captive Bubalina buffalo (*Bubalus bubalis*)

This topic explores the grazing behaviour of captive Bubalina buffalo (*Bubalus bubalis*). In general, buffalo are considered “grazers rather than browsers” due to the type of vegetation they consume (Napolitano et al. 2016). Grazing is defined as the consumption of low vegetation whereas browsing is the feeding of leaves or higher vegetation (Napolitano et al. 2016). Grazers may also feed on woody vegetation and shrubs depending on abundance and quality of vegetation, but this is less seen in captive buffalo as their environment is typically modified (De la Cruz-Cruz et al. 2014; Napolitano et al. 2016). Several papers such as the work of Napolitano et al. (2016) focused on captive buffalo and the various factors that affected grazing preferences. Feed measurements, sampling methods and observations were made and averaged to synthesize grazing preferences, what role varying factors play on the behaviour and how they affect it (Almeida et al. 2019; Tsiobani et al. 2016). Buffalo grazing behaviour was studied through multiple subcategories; foraging, chewing and swallowing alongside other relevant behaviours such as idling, ruminating and wallowing (Almeida et al. 2019; Galloso-Hernández et al. 2021). These were studied alongside grazing behaviour to better understand time spent grazing and preferences of vegetation in correlation to the surrounding environment.

In order to understand the effects of climatic variation on grazing behaviour, researchers investigated seasons in relation to vegetation abundance and quality (Napolitano et al. 2016; Tsiobani et al. 2016; Tsiobani et al. 2019). Researchers placed buffalo in a habitat dominated by grasslands, containing only a portion of woodland and used a focal sampling method to observe grazing behaviour while recording and analyzing the type of vegetation consumed (Tsiobani et al. 2016; Tsiobani et al. 2019). It was found that time grazing was not affected by season however, diet selection was (Napolitano et al. 2016; Tsiobani et al. 2019). Greater ingestion of low vegetation was observed throughout each season, especially in the warmer months (spring and summer), inferring that when vegetation abundance and quality are high, buffalo prefer to feed on grass over woodland and shrubs (Tsiobani et al. 2016; Tsiobani et al. 2019). Climate was also found to have an effect on daily ingested feed (Barrio et al. 2000). Studies attempted to determine daily feed-intake by studying the effects of varying thermal stress throughout the day, taking individual body mass into account (Barrio et al. 2000; Galloso-Hernández et al. 2021). Although individuals with a higher body weight typically consumed more kg/day of hay, the change in thermal stress resulted in feed-intake being the highest during the first few meals before slowly decreasing in each buffalo (Barrio et al. 2000; Almeida et al. 2019). Higher ingested intake by heavier individuals can be explained by larger or more well-developed diameter of muscle (Barrio et al. 2000; Vega et al. 2010).

Systemic variation on grazing behaviour was predominantly explored by studying the effects of thermal stress and space of pasture (Almeida et al. 2019; Galloso-Hernández et al.

2021). Researchers studied systems that provided buffalo with trees and shrubs for shade, called silvopastoral systems and conventional systems that were non-shaded regions (Gallosó-Hernández et al. 2021). In these papers, observations were made during daylight hours and each activity done by buffalo were recorded and averaged (grazing, idling, cooling down, standing and laying) (Almeida et al. 2019; Gallosó-Hernández et al. 2021). It was determined that since buffalo attenuate thermal stress through shade, excess thermal stress was a major contributing factor to decreased grazing in captive buffalo (Gallosó-Hernández et al. 2021; De la Cruz-Cruz et al 2014). Spatial effects on grazing behaviour were determined by studying outdoor free-range systems, *lutur* fencing systems (one-meter high limestone fences) and intensive systems (individually penned and confined spaces) (De la Cruz-Cruz et al 2014; Tatipikalawan et al. 2019). By the method of direct observation, it was found that confinement of buffalo caused higher inbreeding, stress and aggravation but showed higher feed-intake and daily weight gain than those of spacious pastures (De la Cruz-Cruz et al. 2014; Tatipikalawan et al. 2019). Through reviewing these papers, a lack of studies from an evolutionary standpoint can be identified and leaves room for future studies that investigate grazing behaviour of buffalo from generations rather than individuals.

Literature Cited

- Almeida, J. C. F., Joset, W. C. L., Noronha, R. P. P., Barbosa, A.V. C., Lourenço Júnior, J. B., & Silva, J. A. R. da. (2019). Behavior of buffalo heifers reared in shaded and unshaded pastures during the dry season on Marajó Island, Pará, Brazil. *Acta Scientiarum Animal Sciences*, 41(1), 1807-8672. <https://doi.org/10.4025/actascianimsci.v41i1.43088>
- Barrio, J. P., Zhang, S.Y., Zhu, Z. K., Wu, F. L., Mao, X. Z., Bermúdez, F. F., & Forbes, J. M. (2000). The feeding behaviour of the water buffalo monitored by a semiautomatic feed intake recording system. *Journal of Animal and Feed Sciences*, 9(1), 55-72. <https://doi.org/10.22358/jafs/68029/2000>
- De la Cruz-Cruz, L., Guerrero-Legarreta, I., Ramirez-Necoechea, R., Roldan-Santiago, P., Mora-Medina, P., Hernandez-Gonzalez, R., & Mota-Rojas, D. (2014). The behaviour and productivity of water buffalo in different breeding systems: A review. *Veterinarni Medicina*, 59(4), 181-193. <https://doi.org/10.17221/7479-VETMED>
- Galoso-Hernández, M. A., Soca-Pérez, M., Dublin, D., Alvarez-Díaz, C. A., Iglesias-Gómez, J., Díaz-Gaona, C., & Rodríguez-Estévez, V. (2021). Thermoregulatory and feeding behavior under different management and heat stress conditions in heifer water buffalo (*Bubalus bubalis*) in the tropics. *Animals*, 11(4), 1162. <https://doi.org/10.3390/ani11041162>
- Napolitano, F., Grasso, F., Saltalamacchia, F., Martiniello, P., Bilancione, A., Pacelli, C., & Rosa, D. (2016). Grazing behaviour of buffalo heifers. *Italian Journal of Animal Science*, 6(2), 19-22. <https://doi.org/10.4081/ijas.2007.s2.1256>
- Tatipikalawan, J. M., Nurtini, S., Sulastri, E., & Widi, T. S. M. (2019). Utilization of lutur in the traditional grazing system of buffalo production in Moa Island – Maluku, Indonesia. *IOP Conference Series: Earth and Environmental Science*, 387(1), 12070. <https://doi.org/10.1088/1755-1315/387/1/012070?>
- Tsiobani, E. T., Yiakoulaki, M. D., Hasanagas, N. D., Menexes, G., & Papanikolaou, K. (2016). Water Buffaloes grazing behaviour at the Lake Kerkini National Park, Northern Greece. *Hacquetia*, 15(2), 133–142. <https://doi.org/10.1515/hacq-2016-0015>
- Tsiobani, E. T., Yiakoulaki, M. D., & Menexes, G. (2019). Seasonal variation in water buffaloes' diet grazing in wet grasslands in Northern Greece. *Hacquetia*, 18(2), 202-212. <https://doi.org/10.2478/hacq-2019-0004>
- Vega, R. S. A., Del Barrio, A.N., Sangel, P.P., Katsube, O., Canaria, J. C., Herrera, J. V., Lapitan, R. M., Orden, E. A., Fujihara, T., & Kanai, Y. (2010). Eating and rumination behaviour in Brahman grade cattle and crossbred water buffalo fed on high roughage diet. *Animal Science Journal*, 81(5), 574-579. <https://doi-org.ezproxy.lib.ucalgary.ca/10.1111/j.1740-0929.2010.00784.x>