

Dietary survey of captive southern white rhinoceros populations (*Ceratotherium simum simum*)



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Background

- There are 46 AZA and 4 private institutions currently contributing to the Southern White Rhino (SWR) SSP.
- Rates of reproduction in captive-born SWR females are surprisingly low.
 - Several potential factors contributing to this lack of reproductive success, diet and nutrition should be carefully considered.
 - Perhaps phytoestrogens present in the rhino diet are having a negative impact on breeding success in the species [1]?
- Domestic horse shares similar digestive physiology to the SWR, currently serves as the best model for SWR diets [2, 3]. However, research has shown that perhaps certain fat-soluble vitamins are not absorbed equally by both taxa [4].
- No scientific basis for the inclusion of pellet products in the feeding regime of strict herbivores [5].
- It may prove difficult for many zoos to provide the sheer volume of pasture that SWR require. Because of this, ad libitum grass hay is offered to rhinos as the primary portion of diet in almost all cases.
- Conducted a survey of current feeding regimes across facilities housing SWRs..

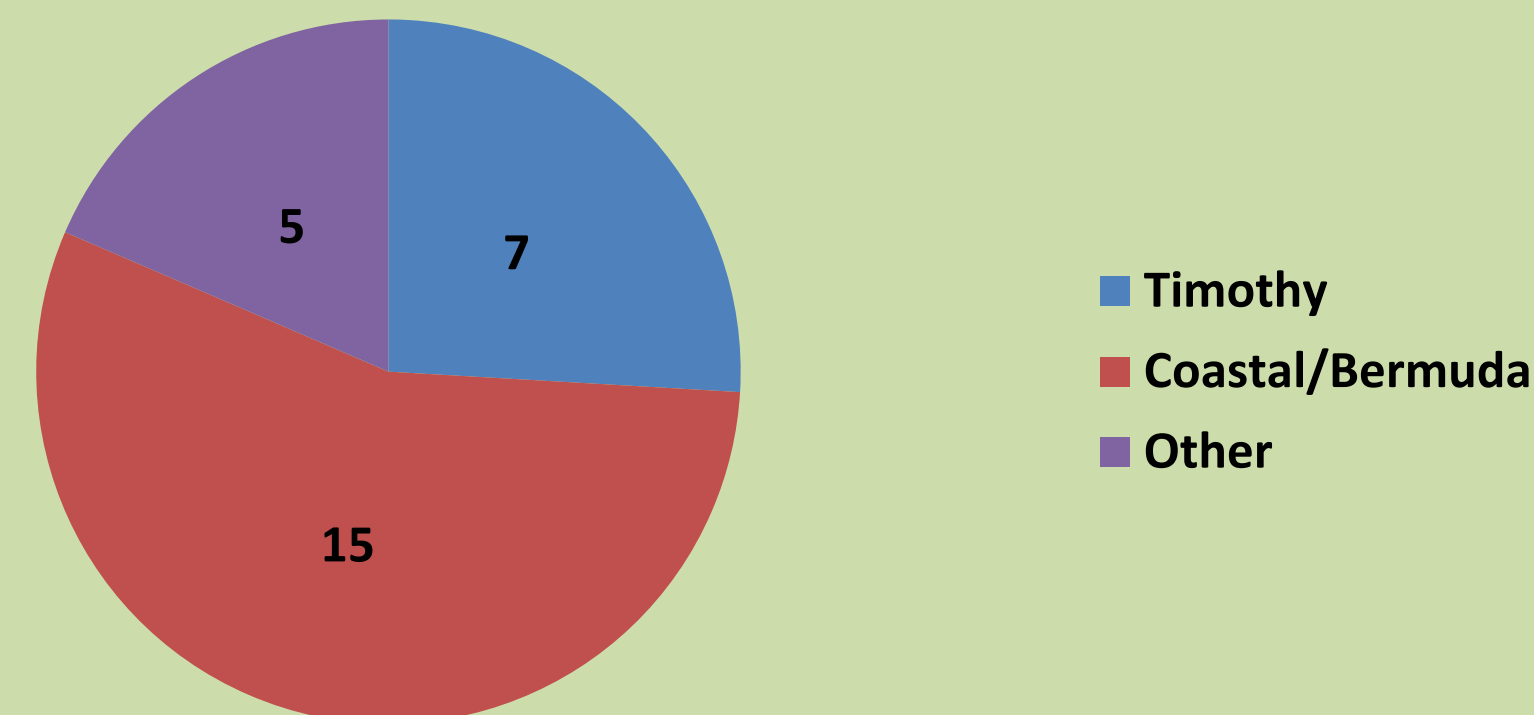
Results

- 27 responses to date.
- We see a great deal of variation among institutions.
- It is important to recognize that 20 facilities among 27 responders have less than three acres of available rhino pasture.
 - 15 of the 20 responded as having no pasture at all.
- 62% of responding facilities still feed some degree of alfalfa.

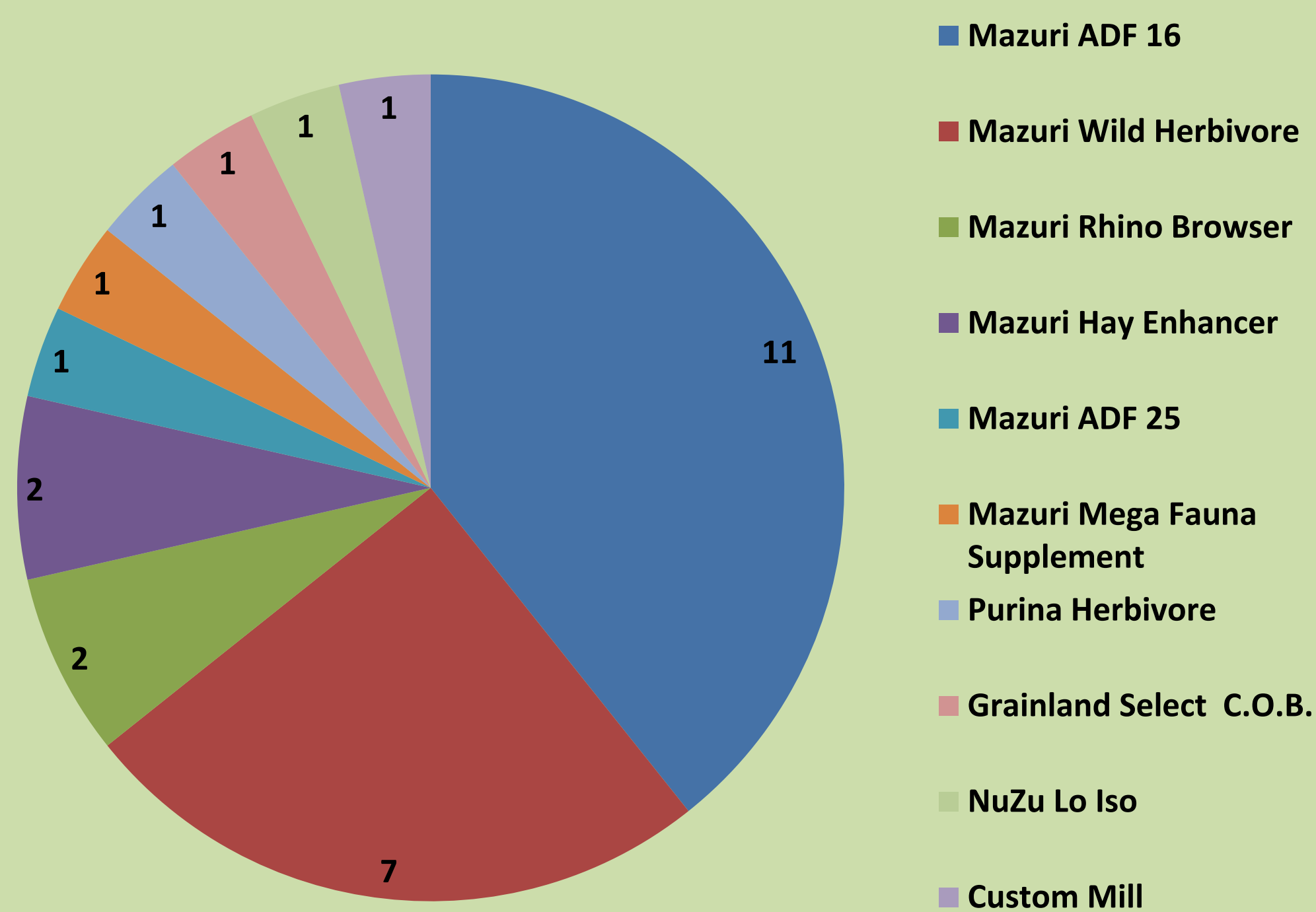
Points of Interest

- While current recommendations for SWR diet are modeled after recommendations for the domestic horse, SWR diet formulation must progress to the development of rhino-specific recommendations.
- The typical diet of a SWR is generally described as having a high fiber and low to moderate protein content [5].
- Thus far, only three facilities have reported deficiencies observed from blood analyses. However, it is unknown what screening procedures are in place at those facilities surveyed. In future, researchers should consider asking more specific questions about blood analysis.
- Considering recent research [1], it was unexpected to see how many facilities continue to feed alfalfa to their SWR population.
- Given the lack of diet consistency between facilities, it is apparent that further research is in order. While it may not be possible to fully standardize diet procedure—due to individual facility circumstances—it could be feasible to reduce the amount of inconsistencies and attain a more sustainable reproductive outcome in our captive SWR population.

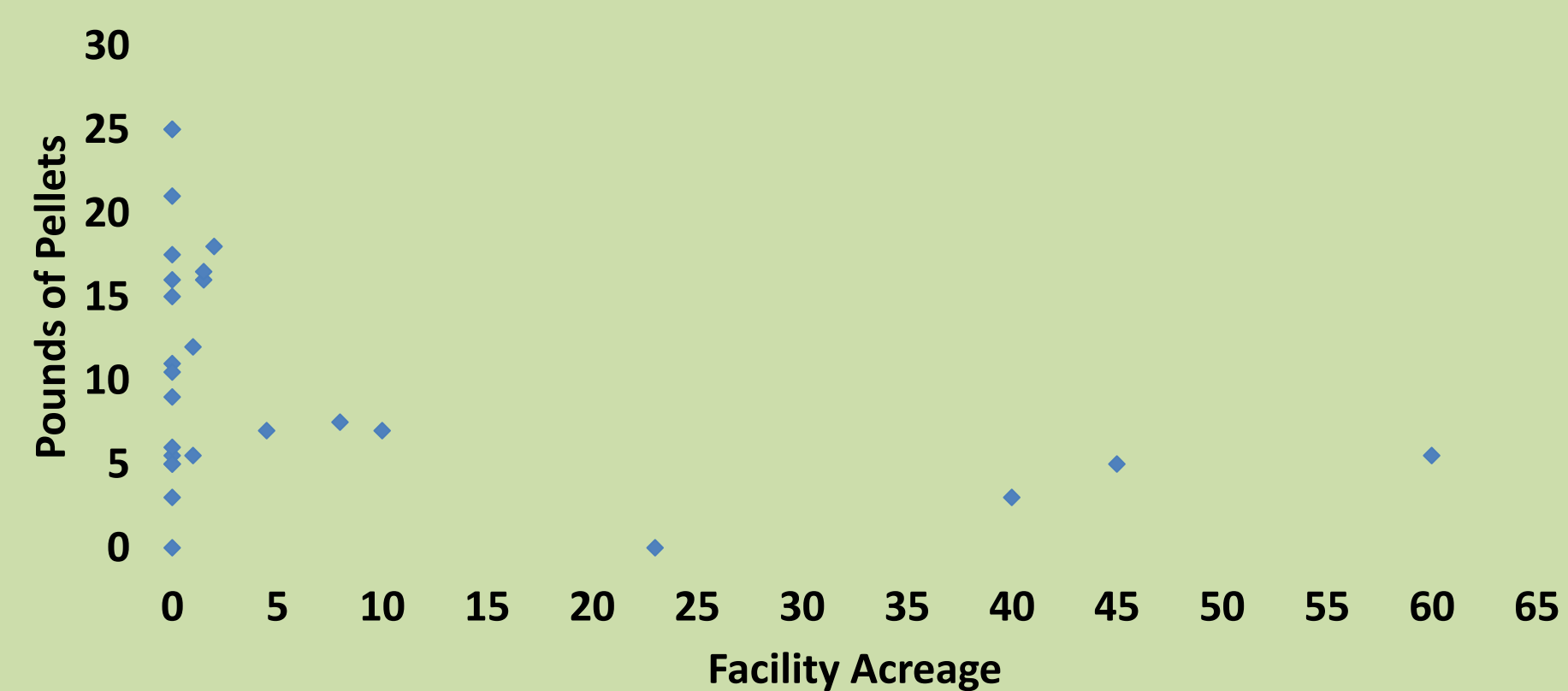
Number of facilities feeding hay type



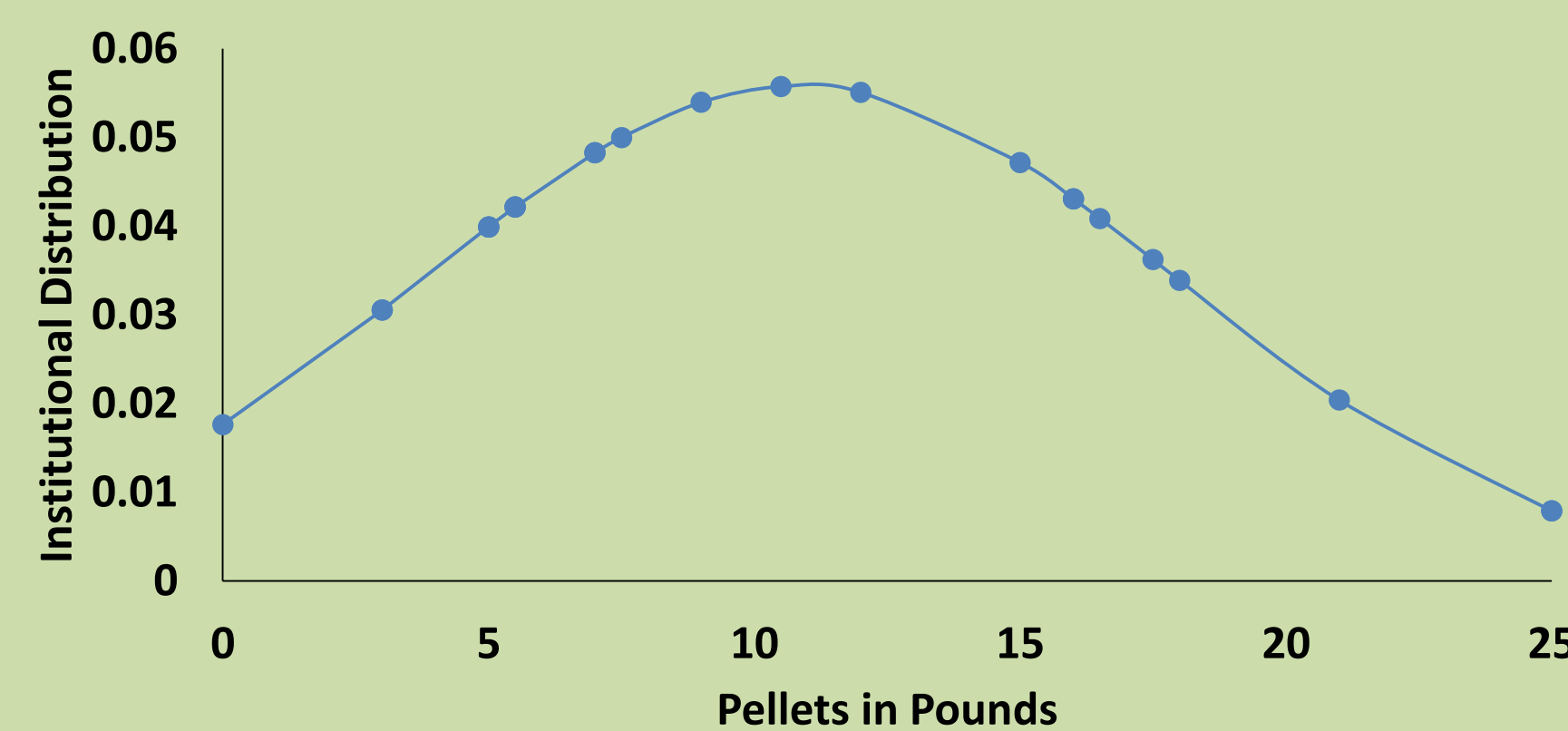
Number of facilities feeding pellet type



Correlating pasture size and pellet quantity



Distribution of amount of pellets fed



References

- [1] Tubbs, C. W., et al. (2016). Estrogenicity of captive southern white rhinoceros diets and their association with fertility. *General and Comparative Endocrinology*, 238, 32-38.
- [2] Metrione, L., & Eyres, A. (2014). Rhino Husbandry Manual. Retrieved from <http://www.rhinos.org/wp-content/uploads/2015/08/rhino-husbandry-manual.compressed.pdf>
- [3] Dierenfeld, E. (1999). Rhinoceros Feeding and Nutrition (M. E. Fowler & R. E. Miller, Eds.). In *Zoo & wild animal medicine: current therapy* (4th ed., 568-571).
- [4] Clauss, M., et al. (2002). Fat soluble vitamins in blood and tissues of free-ranging and captive rhinoceros species. *Journal of Wildlife Diseases*, 38(2), 402-413.
- [5] Clauss, M., & Hatt, J. (2006). The feeding of rhinoceros in captivity. *International Zoo Yearbook*, 40(1), 197-209.

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