BROWSE NUTRIENT ANALYSES AT DISNEY'S ANIMAL KINGDOM: THERE'S SOMETHING ABOUT BROWSE

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Abstract

Feeding exotic herbivores under human care can be fraught with challenges in terms of replicating natural nutrient offerings, or even understanding what a normal requirement would be to maximize health. While recommendations of feeding browse to species known to consume leaves and stems of plants in the wild seems fundamental, it is important to keep in mind how variable the plants grown in the United States can be, both in comparison to their African counterparts, and even to each other. Understanding these variables can be important in formulating animal diets, taking into consideration that browse provides more than a solid fiber source. While quantifying intake of browse can be challenging, estimating contribution of browse to the diet is integral. This is true when dietary recommendations include moving to a larger amount of browse when possible, such as with black rhinoceroses.[1]

At Disney's Animal Kingdom, we do our best to quantify browse consumption for our browsing species such as kudu, giraffe, black rhino, bongo, gerenuk, porcupines, primate species, and many others. Using these estimates and analyzed browse items (Table 1), we attempt to determine the contribution of browse to the nutrient intake of these exotic species. This can be important to overall dietary formulation, especially if the contribution (often up to 30% of diet) consists of dietary imbalances such as reversed calcium to phosphorus ratios, variable protein content, or high iron, for example. Nutrient content will be influenced by different growing locations, soil nutrients, irrigation, temperature, harvest time and sun exposure, as well as portion of browse sampled (leaf, green stem, bark, etc.). While quantifying browse partition feeding may be possible, we began our calculations using overall estimates of whole browse offered.

Literature cited

1. Clauss, M., Dierenfeld, E., Goff, J., Klasing, K., Koutsos, L., Lavin, S., Livingston, S., Nielson, B., Schlegel, M., Sullivan, K., Valdes, E., and A. Ward. 2012. IOD in rhinos-nutrition group report: report from the nutrition working group of the International Workshop on Iron Overload Disorder in Browsing Rhinoceros (February 2011). J. Zoo Wildl. Med., 43:S108-S113.

Table 1. Analyzed nutrient content of a selection of whole branches of browse species fed at Disney's Animal Kingdom

Kind	Water	Dry Matter	Crude Protein	ADF	NDF	Lignin	Starch	WSC-Water Sol. Carb.	ESC - Sugars	Crude Fat	Gross Energy
Unit	%	%	%	%	%	%	%	%	%	%	cal/g
Willow (*Salix caroliniana*)	59.1	40.9	7.2	31.9	41.8	12.1	2.1	25.9	10.2	2.6	4999
Ear Leaf Acacia *(Acacia auriculiformis*)	52.4	47.6	11.7	37.4	49.7	17.0	1.2	11.4	7.7	3.7	nd
Japanese blueberry (*Elaeocarpus sylvestris*)	62.4	37.6	9.6	23.8	36.0	nd	3.9	23.5	1.6	3.4	4620
Ficus benjamina	69.0	31.0	8.3	39.4	50.1	13.3	1.6	4.1	3.6	4.1	nd
Ficus rubiginosa	72.5	27.5	12.0	30.9	40.1	12.4	1.5	6.9	9.6	3.6	nd
Acacia Saligna	68.8	31.2	17.0	49.1	52.0	23.6	0.8	1.8	8.0	3.0	4493
Silverberry (*Eleoagnus pungens*)	66.6	33.4	19.3	46.8	59.6	19.3	0.1	5.1	3.7	3.5	4461
Mulberry (*Morus rubra*)	59.2	40.8	10.6	48.0	56.8	12.0	1.5	12.4	7.1	4.0	4070
Wax myrtle (*Myrica cerifera*)	56.4	43.6	11.3	33.2	43.7	16.1	1.1	23.6	10.1	4.7	4970
Rubber tree (*Ficus elastica*)	80.8	19.2	7.9	43.1	44.5	26.0	1.3	14.7	13.6	4.4	4665
Kind	Ash	Ca	P	Mg	Fe	Zn	Cu	Mn	Mo	Se	Co
Unit	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Willow (*Salix caroliniana*)	4.36	0.86	0.1	0.17	28	360	9	78	2.8	0.02	0.02
Ear Leaf Acacia *(Acacia auriculiformis*)	5.14	1.56	0.06	0.21	102	13	12	28	2.7	0.23	0.28
Japanese blueberry (*Elaeocarpus sylvestris*)	6.93	1.55	0.30	0.25	82	20	7	192	1.2	0.04	0.21
Ficus benjamina	14.41	4.06	0.12	0.40	56	15	5	19	0.8	0.10	0.19
Ficus rubiginosa	6.81	0.88	0.20	0.24	33	16	5	21	0.3	0.02	0.16
Acacia Saligna	5.65	0.83	0.20	0.41	52	34	3	13	11.5	0.28	0.00
Silverberry (*Eleoagnus pungens*)	5.19	0.85	0.16	0.17	103	38	6	390	1.3	0.07	0.27
Mulberry (*Morus rubra*)	5.30	0.72	0.23	0.18	140	27	9	208	1.2	0.03	2.39
Wax myrtle (*Myrica cerifera*)	6.22	1.32	0.09	0.21	92	20	4	51	0.4	0.05	0.00
Rubber tree (*Ficus elastica*)	6.76	0.91	0.22	0.32	32	17	4	12	0.7	0.00	0.14

nd = not determined