DESIGNING ANALYTICAL SOFTWARE FOR GLOBAL DATA SHARING OF RHINOCEROS BROWSE AND DIET INFORMATION

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As part of an ongoing effort to develop information resources and tools integrating valuable global research, we present a database and software model that integrates feeding habits, browse usage information, nutrient composition of native and substitute foods, and captive diet records for rhinoceros species. Screen displays and output reports include: Browses/Forages Offered, Browse/Forage Nutrient Composition, Diets Fed by Zoological Facility, Nutrient Recommendations, and Nutrient Comparisons. Nutritionbased information for captive wild animals is often difficult to locate, and more so to collate for dietary evaluation. Presenting this collection of data in a simplified, concise format to researchers and zoological staff is challenging. ZootritionTM software has pioneered a format for data collection and presentation, in an attempt to improve diet management and evaluation. Using ZootritionTM as a technical foundation, we continue to further develop simplified means to aid researchers in utilizing this data in a proactive and beneficial way. The Rhinoceros Taxon Advisory Group provides an opportunity to develop this prototype. With appropriate database modifications, similar information can be readily compiled through collaborative efforts with other TAG and SSP priority species. This software model can be utilized to collate and disseminate species-specific browse, diet, and nutrient information. It can also be used to compare dietary ingredients and nutrient content of diets submitted from AZA and other global-based zoological institutions. These databases can then be used to compare feeds on a local or regional basis. Maximizing input into the database can only serve to improve animal care within zoological institutions and native habitats.

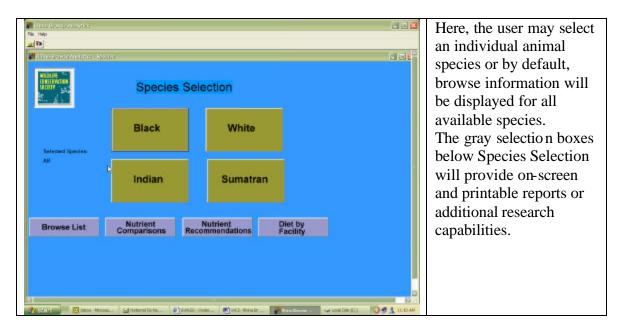
Examples

Below are screen displays from the Rhino Browse facility. They show a simplified interface that directs the user intuitively to information within the database. The user is prompted to view information by animal species, to note the feeds associated with those species, to develop comparisons between diets and nutrient requirements or among appropriate feeds, or to view diets associated with specific animals in specific institutions. The latter is information that will be acquired and developed by the WCS in cooperation with AZA member facilities and other animal locations, through collaboration with an American Association of Zoo Keepers (AAZK) working group.

EXAMPLE – MAIN SCREEN

	tin			On the main screen, the user may select browse
	Rhino Brows	e Analytics	information by either animal species, by the feeds associated with	
	Animal Species	Feeds		those species, by a comparison of nutrients contained in feeds, by
	Nutrient Comparisons	Diet by Facility		recommended diets, or by species' diets used at individual facilities.
	Please select an option			
and the second s	box -Hones, Greenston, ()	1925-Onie	Constitution of the bound A.	

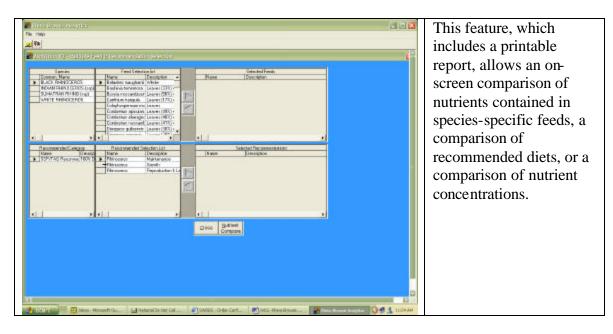
EXAMPLE – ANIMAL SPECIES SELECTION SCREEN



EXAMPLE – BROWSE LIST REPORT

 atio b B i di d	Contraction of the second strength of the second strength in	Here, a report is displayed containing					
NUCLIN CIRCLEWATER SECOND		Feed Repo	erf (6/28/2603		available published data for browse as it relates to a specific rhino species.
Feeds for Rhinos Species: BLACK RS	INOCIROS						
Ecol Name Rabaires caragitanci	Description Whate	Ered Baseur Zantezi Valley, Zanhalowe	Data Bearin Discussifield of al., 1995	Serving Siles 0.00			
Sealurie tomentos	Leaves (1976) + Twigs (1776)	Zembrei Valley. Zenhabert	Derestelle et al.,	8.09			
Bourie messeminiamons	Leaves (1816) + Twig (44%)	Zombrei Valley. Zaskalere	Dermield et al., sons	0.00			
Canthiam trangula	Leaves (17%) + Twigs (19%)	Zenhert Valley. Zinhebwe	Dermittif et d., 1995	0.00			
Colophropennum mepen	i Lenora	Zambrei Valley. Zambabwa	Dermittig et al., 1985	9.00			
Combernes optication	Leaves (49%) + Twigs (21%)	Zamberi Valley. Zambabwa	Diermitell et al., 1983	0.00			
Combrenza elasagnoides	Leaver(48%) + Twign(32%)	Zambert Valley, Zambabwa	Disrecield et al., 1983	9.00			
Combining the second se	Leaves (40%) + Twigs (45%) + Fraid (16%)		Disrenfeld et al., 1993	0.09			
Dinepyros gallowneis	Lauves (30%) + Twigs (70%)	Zamberi Valley, Zanbabwa	Disrecteld et al., 1995	8.00			
Discryyros estimate	Leaves (29%) + Trigs (12%)	Zambert Valley. Zänkahwa	Disrutfeld et al., 1995	0.00			
Diplethyticitus ready/accepter	Leaves (57%) + Twigs (45%)	Zamberi Valley, Zanbahwa	Disrecteld et al., 1995	8.00.			
Durspens means	Whate	Zambeci Valley, Zambabwe	Discussifett et al., 1995	0.00			
Exploritis caoperi	White	Zambezi Valley, Zimbabwa	Dersefelt et al., 1995	1.00			
Finegen virma	Leaves (19%) - Turga (11%)	Zambezi Valley,	Deresfeld et al.,	8.09		0	

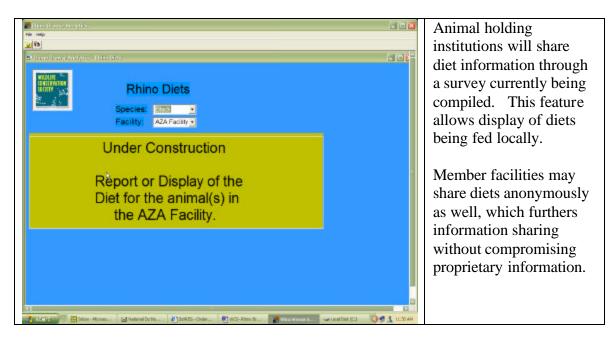
EXAMPLE – NUTRIENT COMPARISON SCREENS



EXAMPLE – FEEDS SCREEN

The two		The Feeds feature also	
<u>u</u> [9]		lists browses (either	
Zeconities 72 - Fred Editories for Freds	Fands	native or cultivated) and,	
Content-Valee Michael Hearty (2006) street Dumiting His Hall (1) and Dumiting His Hall (1) and Dum	Here Do V Labors support M Balance support M Balance support M Banaro transmission M Banaro transmission M Confrance support La Document contracts La Document contracts La Document contracts La	Statute	to a limited extent, other dietary ingredients known to be consumed by the selected
e	Same Solution Solu	Internet (Series Version) New Zondek Version New Zondek Version New That - New Zondek Version New That - Series (Zondek Version New That - Series (Zondek Version New That - Series (Zondek Version New Year) New Ye	rhinoceros species. Full nutrient content for each item can be
Telflert Pace Cempotition Competitor	" Du Haye "Water Ka ya R	* Policity	displayed and printed. There will almost certainly be repetition of feed items between
A State of the second second second	Instanti be Ser, Cel	1 MG- HANG ROUND	species.

EXAMPLE – DIET BY FACILITY SCREEN



Conclusion

The Rhinoceros Browse Analytical Software offers a focused capability to capture, analyze and display browse and diet information for specific rhinoceros species. Clearly, the product offers an opportunity to AZA institutions as well as to other animal research facilities to share further information on rhinoceros diets and nutrition. As such, it represents a model system that can be more broadly applied to other managed populations regionally or globally.