

Giraffe feeding reminder



Marcus Clauss

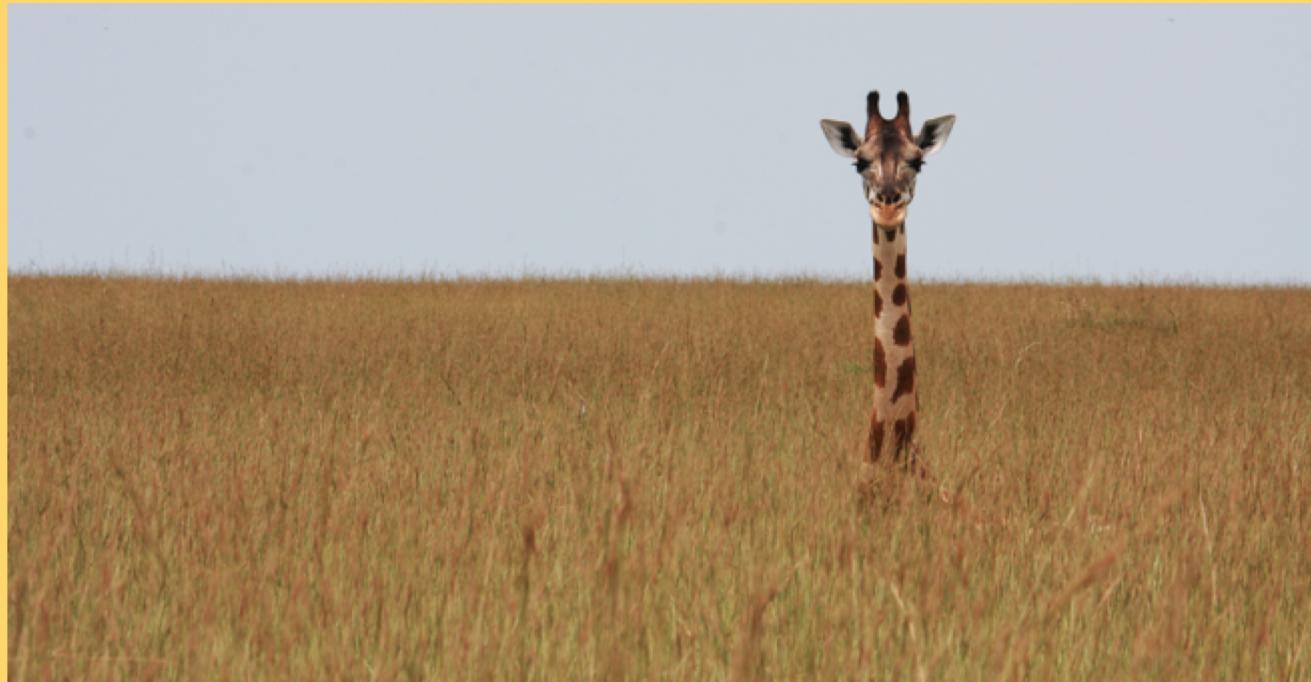
Clinic for Zoo Animals, Exotic Pets and Wildlife, Vetsuisse Faculty,
University of Zurich, Switzerland
Giraffe TAG 2019

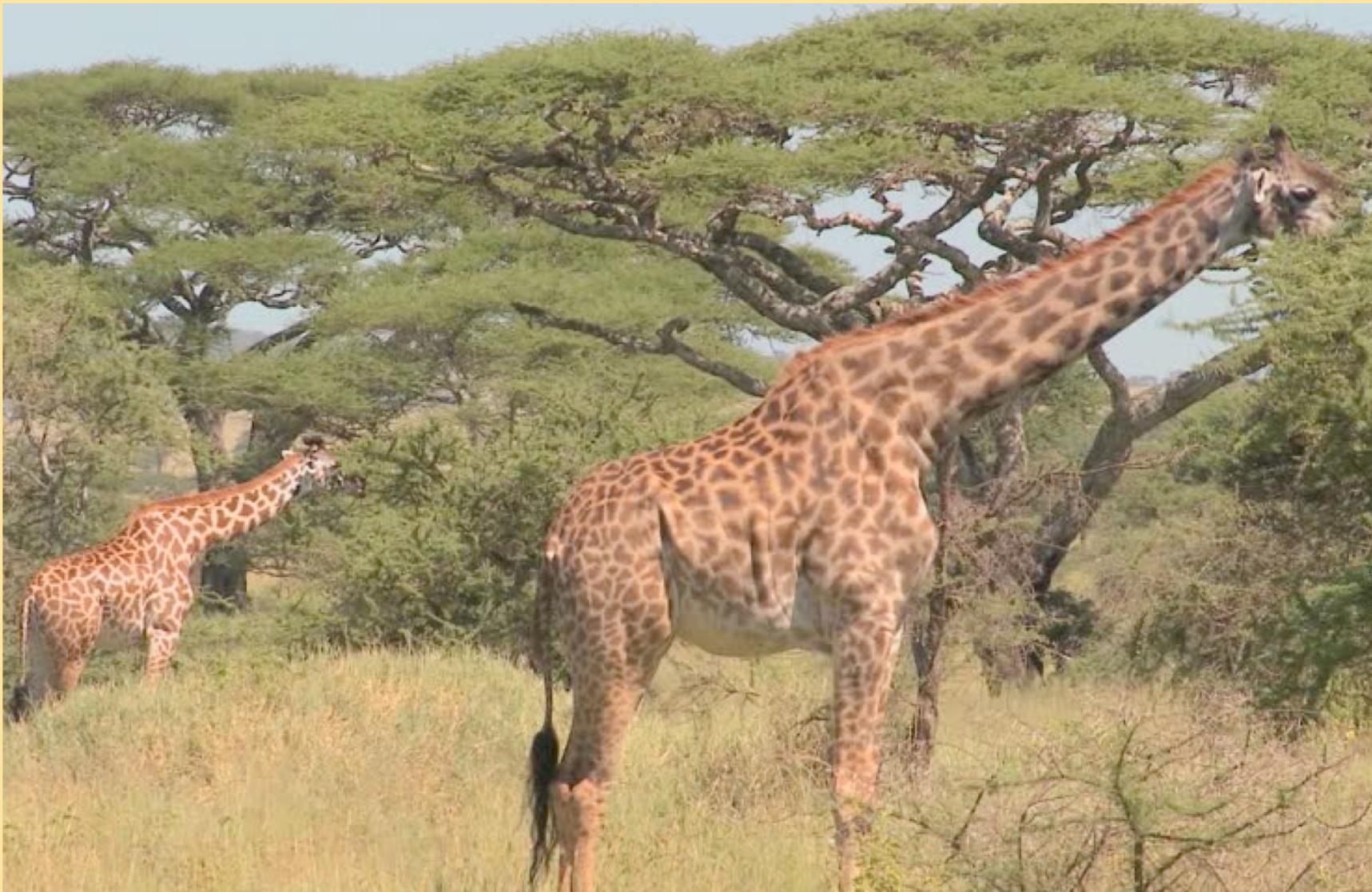


**University of
Zurich^{UZH}**



Clinic
of Zoo Animals, Exotic Pets and Wildlife



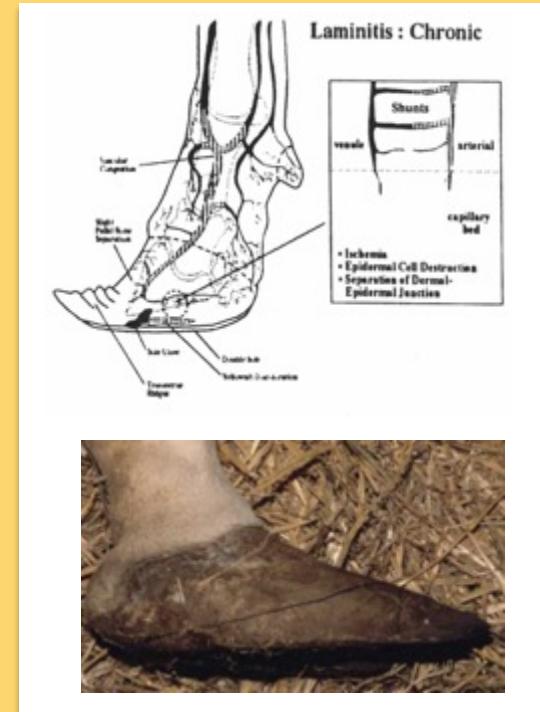


Why is feeding important ?

- to meet nutritional and physiological needs / avoid illness and malfunction

Table 2-14: Proposed nutrients in giraffe diets

Nutrient	Concentration range (dry matter basis)
Based on experience of nutrient concentrations in appropriate diets for medium / large browsers in captivity	
NDF, %	35-50
Protein, %	14
Calcium, %	0.70-0.97
Phosphorus, %	0.36-0.40
Ca : P ratio	≥ 2 : 1
Magnesium, %	0.18-0.24
Potassium, %	1.6-1.8
Sodium, %	0.10-0.44
Iron, mg/kg	126-139
Zinc, mg/kg	54-68
Copper, mg/kg	10-12
Manganese, mg/kg	54-57
Selenium, mg/kg	0.12-0.18
Iodine, mg/kg	0.3-0.4
Vitamin A, IU/g	1.5-2.2
B-Carotin mg/kg	45-55
Vitamin D, IU/g	0.4-0.5
Vitamin E, IU/kg	120-178



Hoof overgrowth

Giraffe survey: Zoos with hoof problems fed more fruits/bread/grains than zoos without such problems (Hummel et al. 2006).



Moose survey: Zoos with hoof problems fed more non-roughages (incl. fruits) than zoos without such problems (Clauss et al. 2002).



Comparing two wild ruminant herds, the one with a higher proportion of concentrates had a lower rumen pH and worse claws (Zenker et al. 2009).

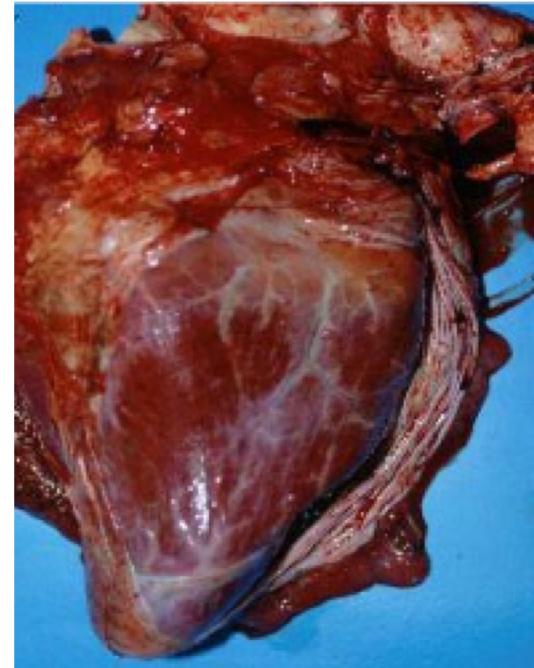
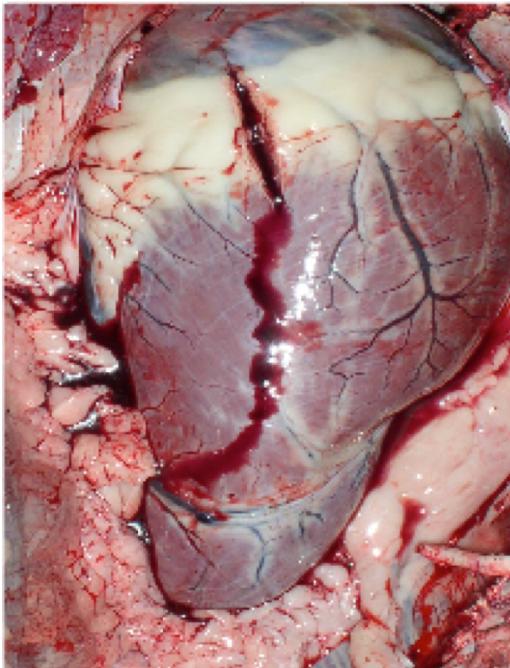


Aim: consistently high food intake

MORTALITY OF CAPTIVE GIRAFFE (*GIRAFFA CAMELOPARDALIS*) ASSOCIATED WITH SEROUS FAT ATROPHY: A REVIEW OF FIVE CASES AT AUCKLAND ZOO

John S. Potter, B.V.Sc., and Marcus Clauss, M.Sc., Dr. med. vet.

Journal of Zoo and Wildlife Medicine 36(2): 301–307, 2005





Why do giraffes eat ‘too little’ ?

Ernährung von Giraffen (*Giraffa camelopardalis*) in Zoohaltung Bewertung der Fütterungspraxis und Charakterisierung von Rationen aus deutschen Zoos

**von Dr. Isabel Gussek, Referentin für Forschungsförderung in
der Bundesanstalt für Landwirtschaft und Ernährung**

Arbeitsplatz Zoo • 1/2017

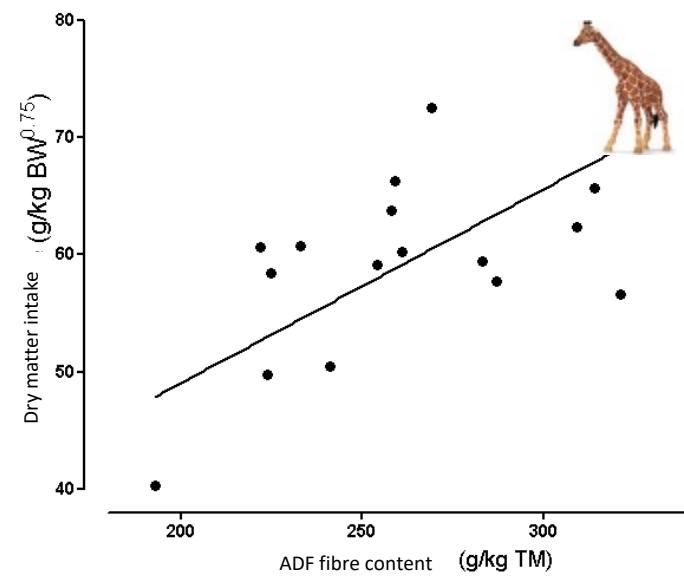
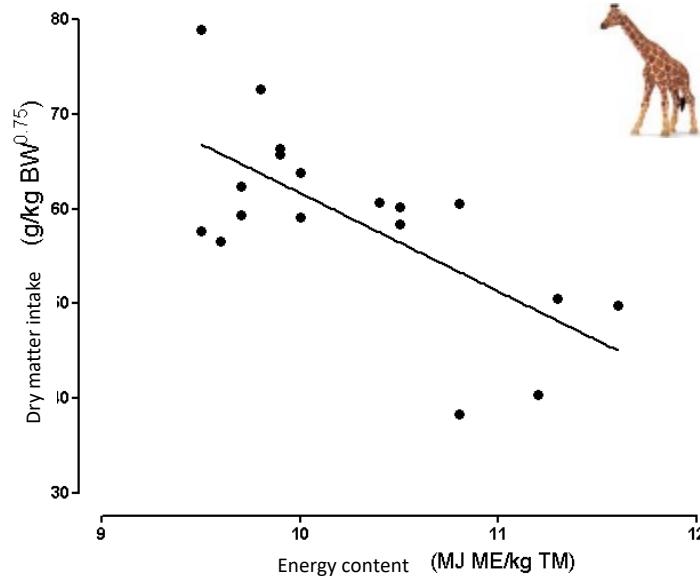


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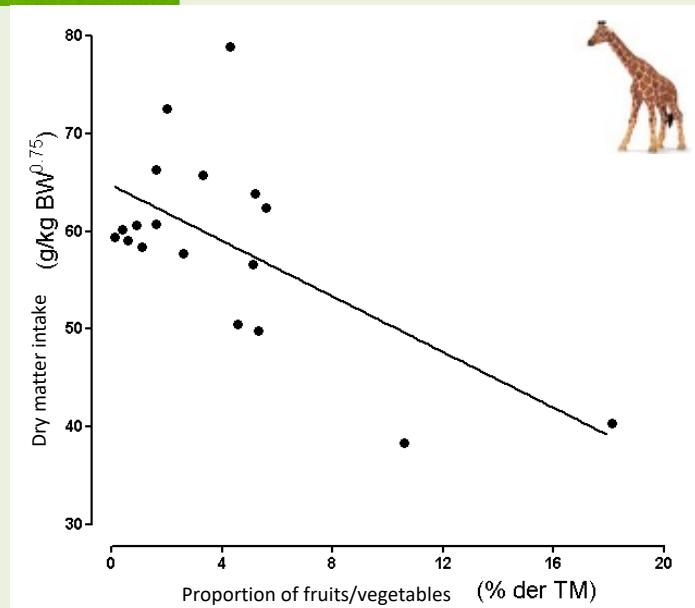


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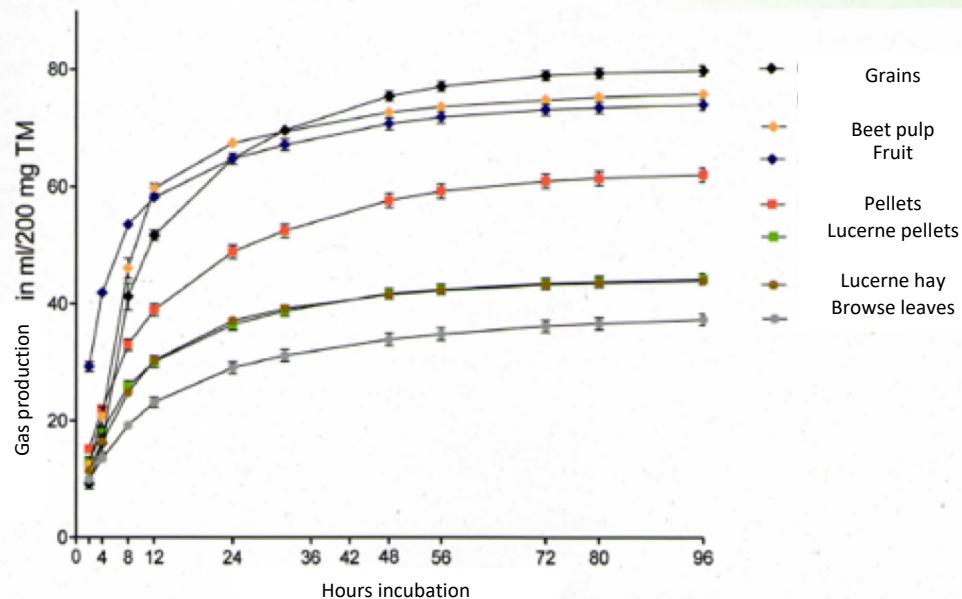


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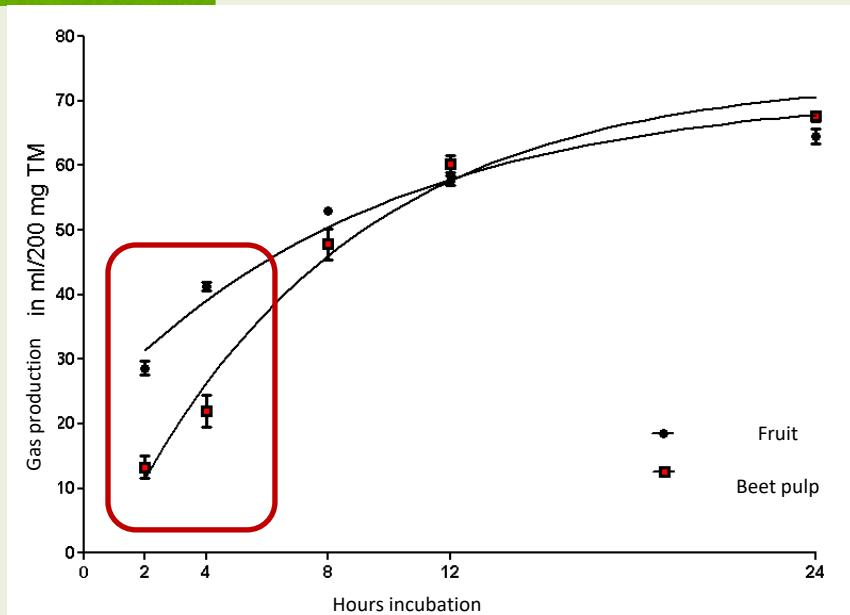


Warum fressen Giraffen 'wenig'?

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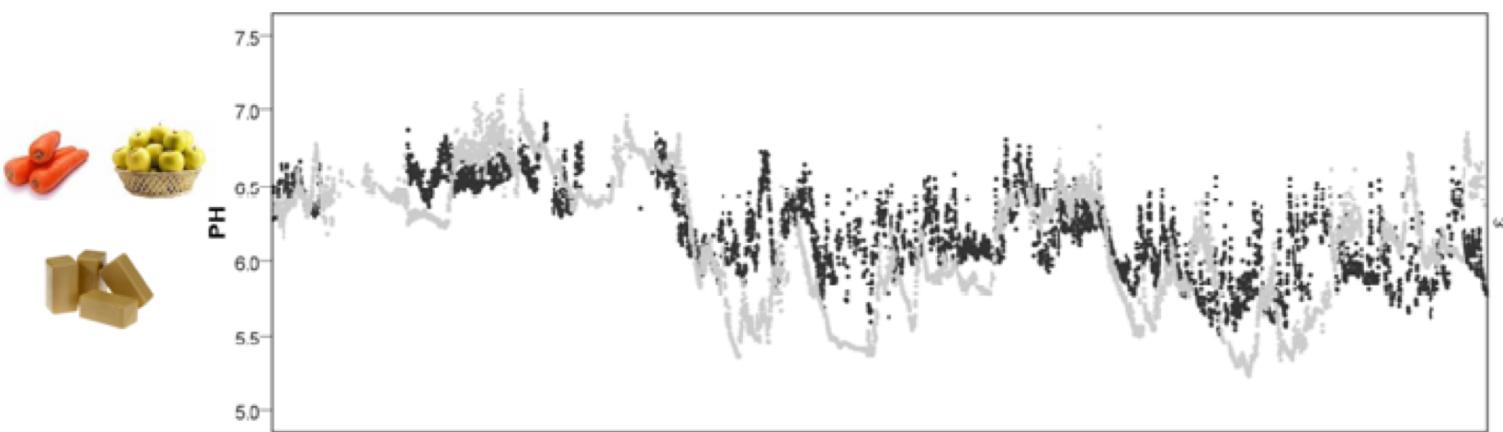
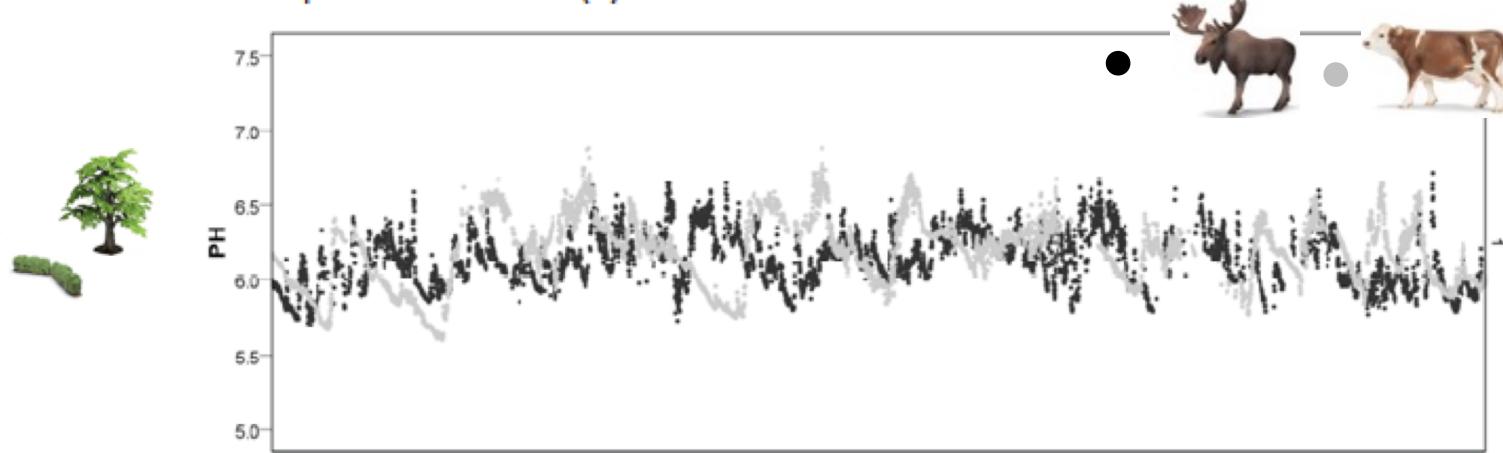


Fermentation and pH

Ruminal pH in cattle (*Bos primigenius f. taurus*) and moose (*Alces alces*) under different feeding conditions: a pilot investigation

Julia Ritz¹, Daryl Codron², Sandra Wenger², E. Eberhard Rensch², Jean-Michel Hatt², Ueli Braun¹ and Marcus Clauss^{2*}

Journal of Zoo and Aquarium Research 2(2) 2014





Strategies against acidosis

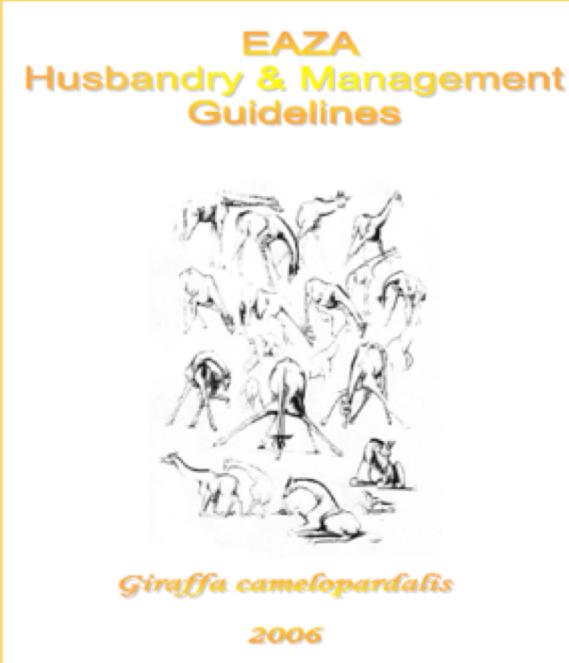
- no fruits / coloured vegetables
- no pellets with a high grain content
- pellets with high content of fibre
- no sudden dosage of pellets (e.g. grid on feeding trough, automatic feeding allotments)



don't use
fruits/carrots!
just a grid
example



Recommendations



- as much browse as possible
- lucerne hay
- pellets with high fibre content
- if part of your story, green leafy vegetables
- browse silage, frozen browse, dried browse etc.
- if not in pellets – linseed, beet pulp

Warning against grains, fruits, coloured vegetables

Linseed

M. Clauss, E.J. Flach, K. Ghebremeskel,
C. Taek, J.-M. Hatt

Supplementing the diet of captive giraffe (*Giraffa camelopardalis*) with linseed extraction chips

Abstract

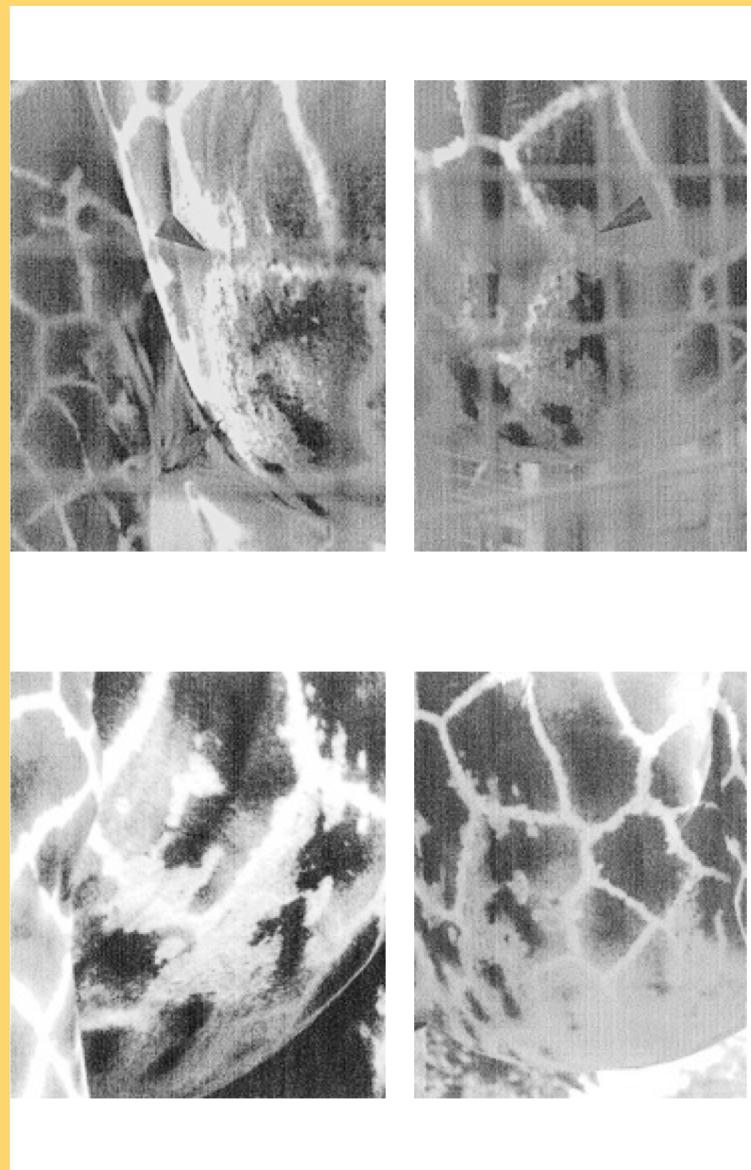
Captive giraffe (*Giraffa camelopardalis*) are reported to have low linolenic acid concentrations in body tissues in comparison with free-ranging individuals. However, it is not known whether this merely reflects a different diet, or whether it impairs body functions. As linseed contains significant amounts of linolenic acid, the feeding of linseed extraction chips might be a practical way of supplementation. Captive giraffe with low linolenic acid status in their blood lipids (compared to domestic ruminants) were introduced to a diet that included linseed extraction chips. Blood lipids of animals from which samples were available after the change in dietary regime ($n = 2$) showed an increase in linolenic acid content. One of the animals had a history of skin lesions resistant to treatment. The skin lesions improved markedly during the course of linseed supplementation. While long-term effects of either linolenic acid deficiency or linolenic acid supplementation in giraffe remain to be demonstrated, these results suggest that giraffe might benefit from the addition of linseed extraction chips to their diet.

Keywords

polyunsaturated fatty acids, linolenic acid, skin lesion,
peracute mortality syndrome

1. Introduction

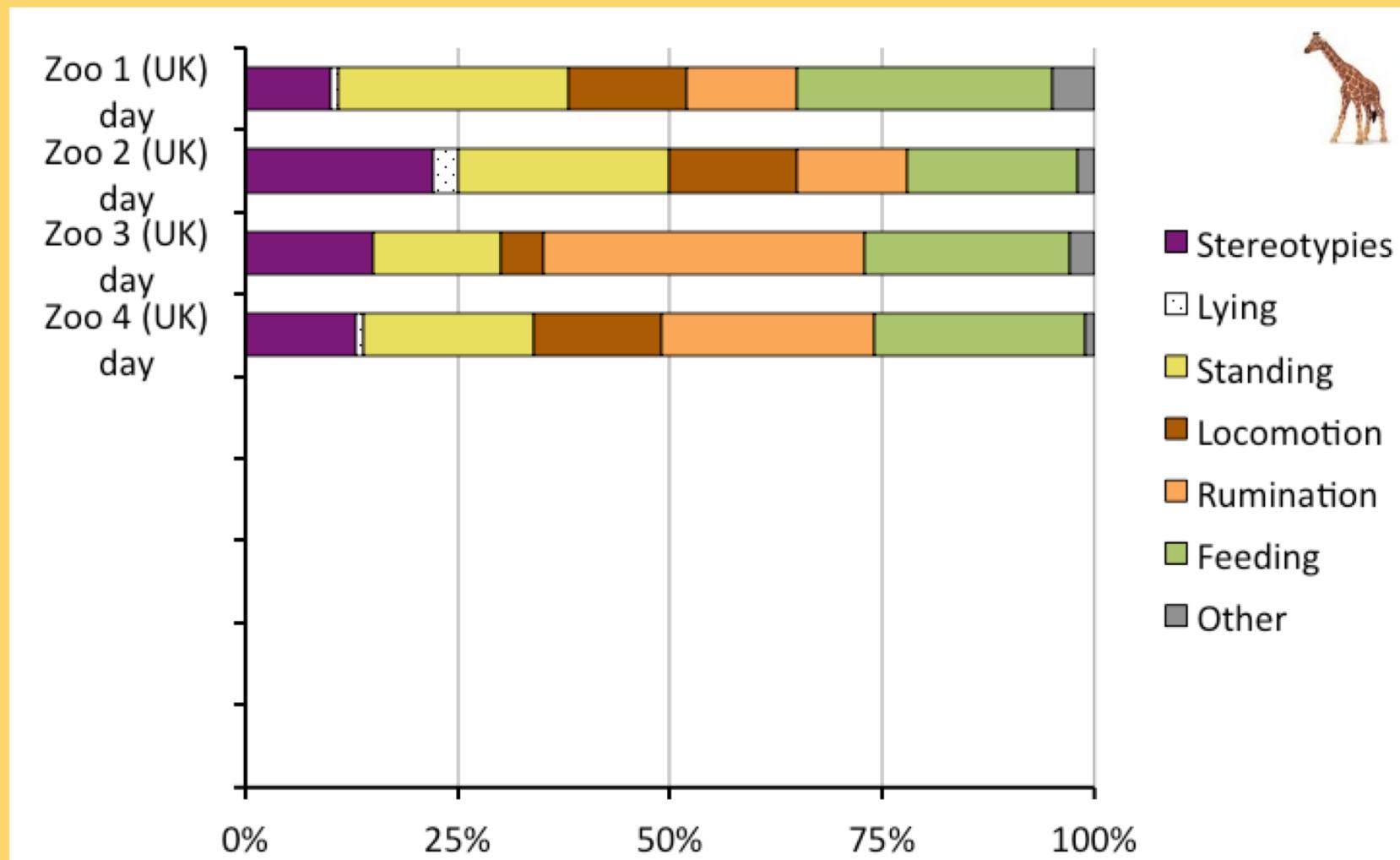
It has been reported that captive giraffe (*Giraffa camelopardalis*) have a much lower content of polyunsaturated fatty acids (PUFA) in body tissues than



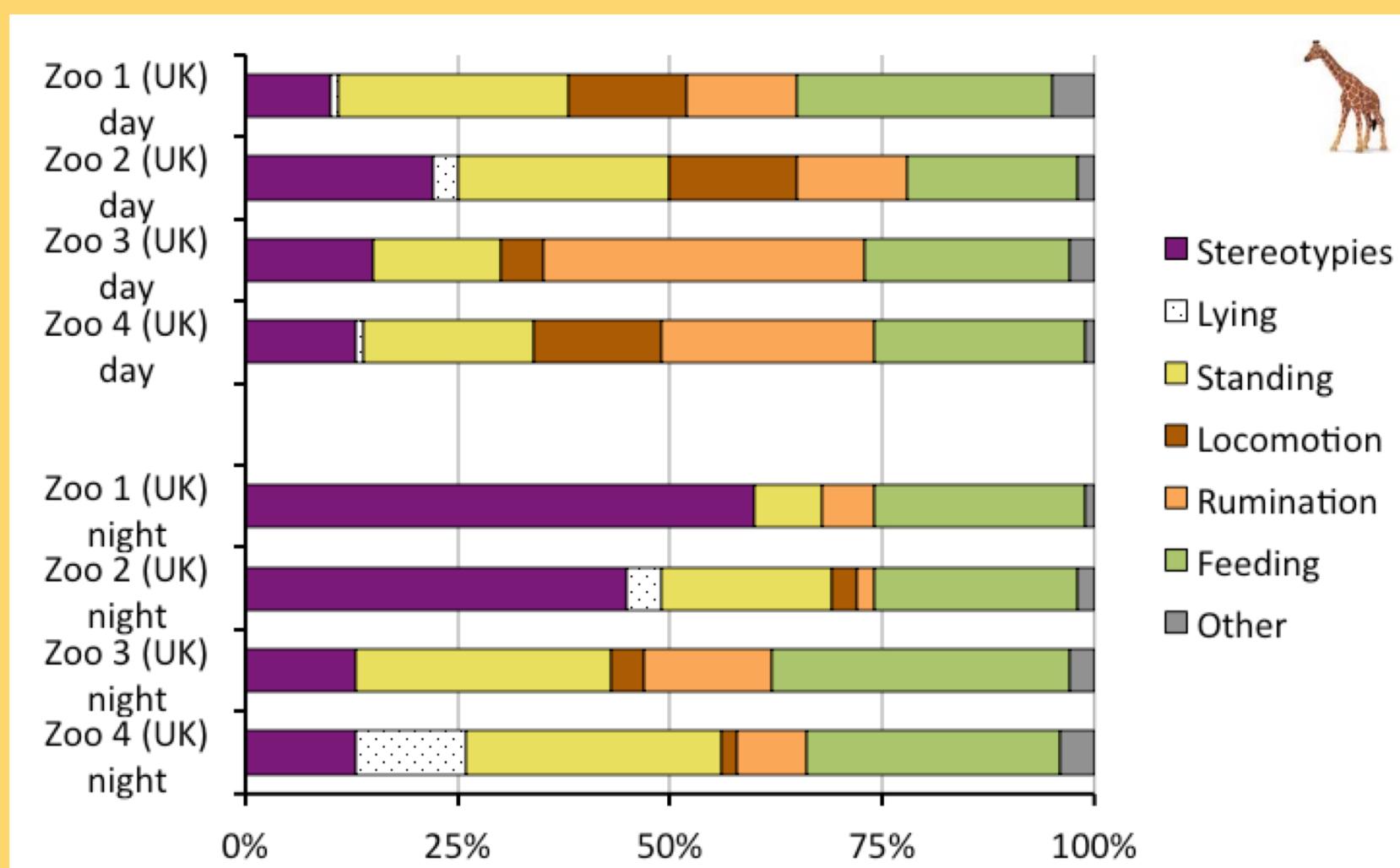


Why is feeding important ?

- to meet nutritional and physiological needs / avoid illness and malfunction
- to meet behavioral needs



Veasey et al. (1996)

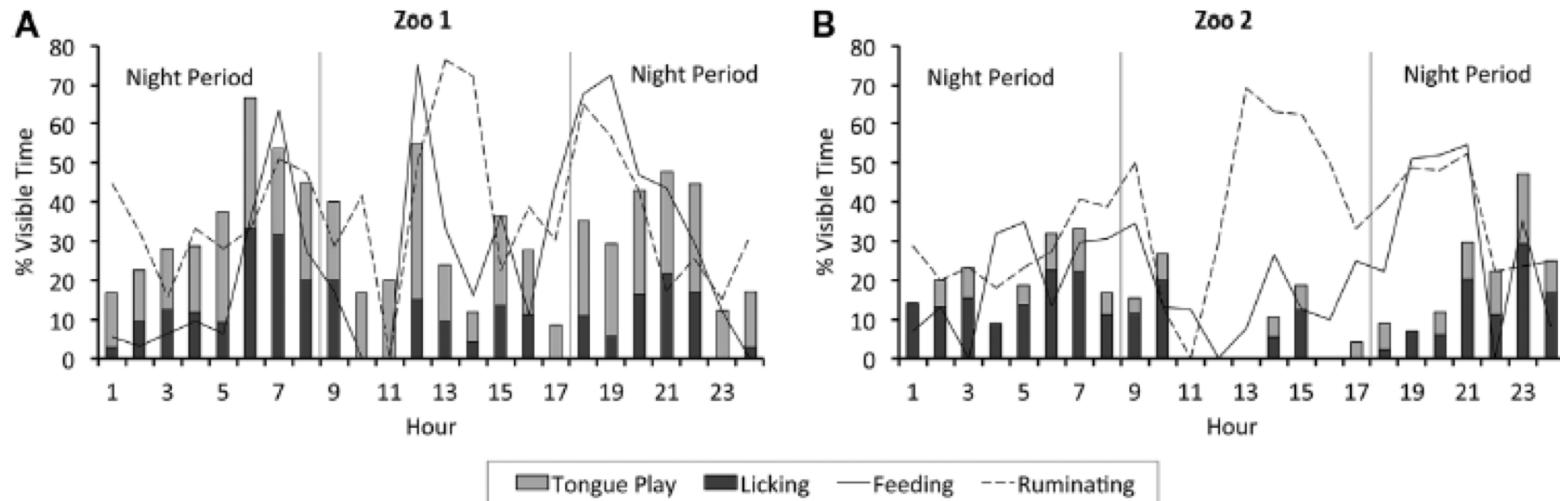




Nocturnal Behavior in Captive Giraffe (*Giraffa camelopardalis*)—A Pilot Study

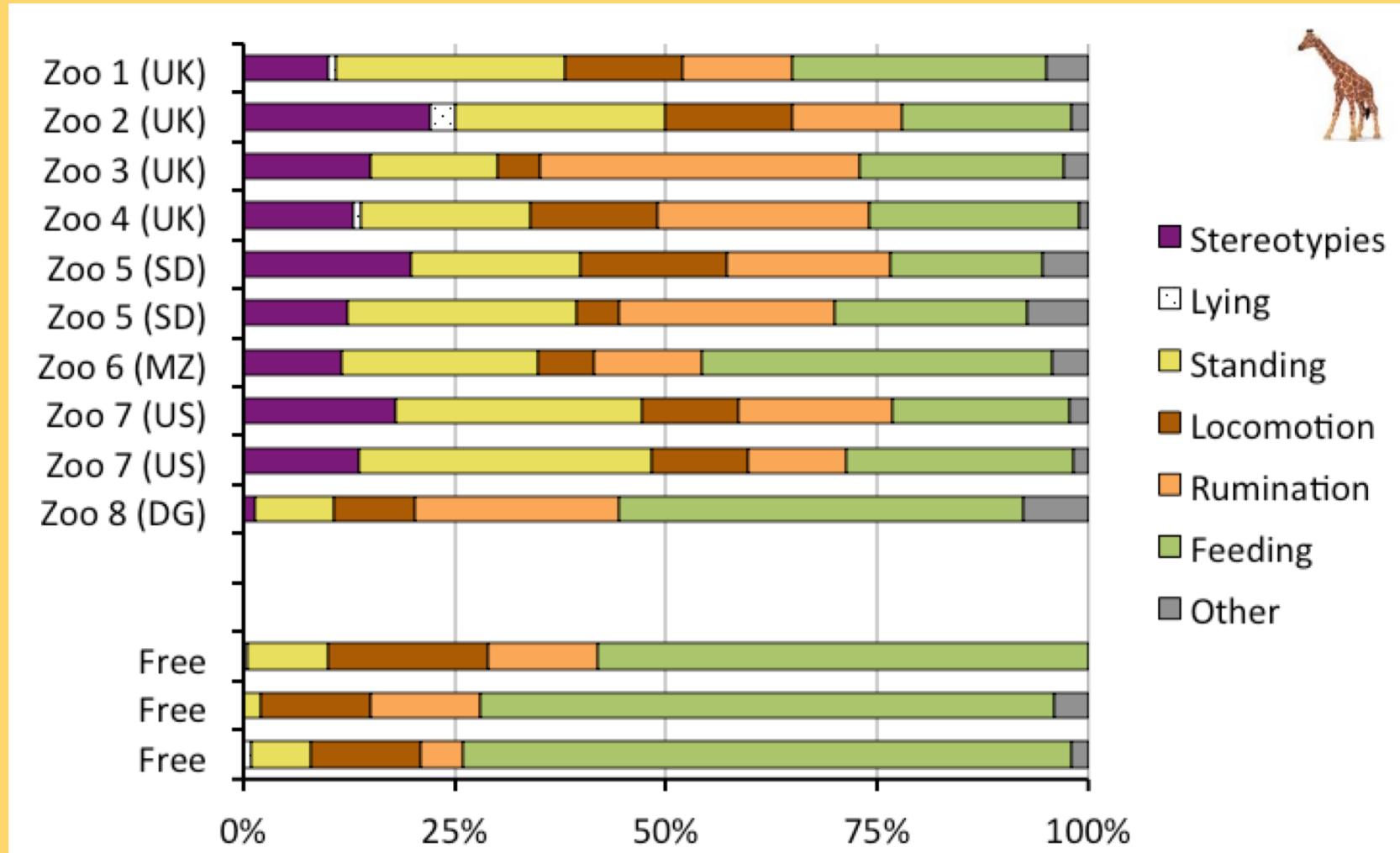
Graham Duggan,^{1,2*} Charlotte C. Burn,³ and Marcus Clauss⁴

Zoo Biology 35: 14–18 (2016)





Aim: few stereotypies – lots of feeding



Veasey et al. (1996), del Castillo et al. (2005), Bashaw (2011), Orban et al. (2016); du Toit & Yetman (2005), Pellew (1984), Schüssler et al. (2015)



Aim: few stereotypies – lots of feeding



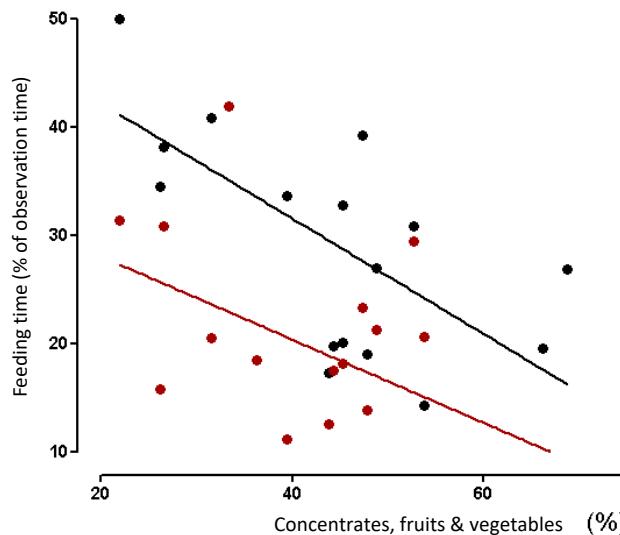


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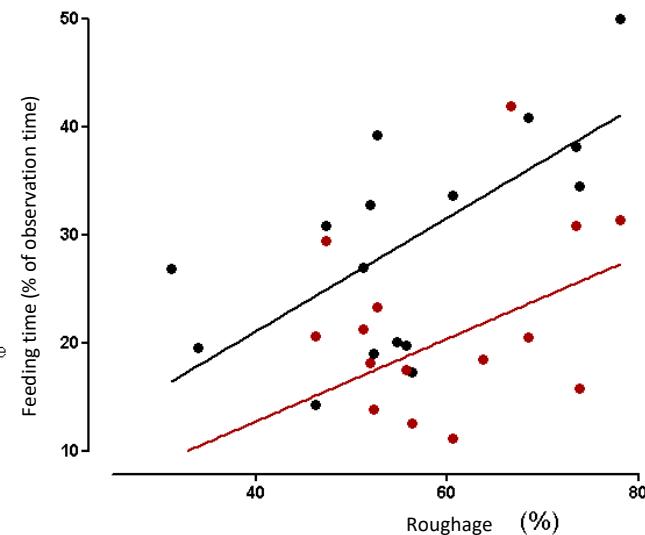
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Arbeitsplatz Zoo • 1/2017



• Grobfutteraufnahme
• Luzerneheuaufnahme



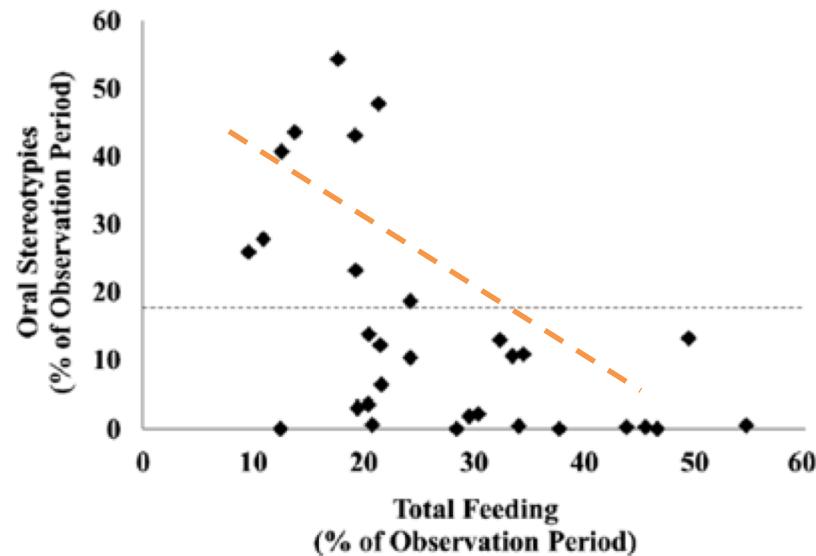


Aim: few stereotypies – lots of feeding

Effects of Guest Feeding Programs on Captive Giraffe Behavior

David A. Orban,^{1,*} Janice M. Siegfried,² and Richard J. Snider¹

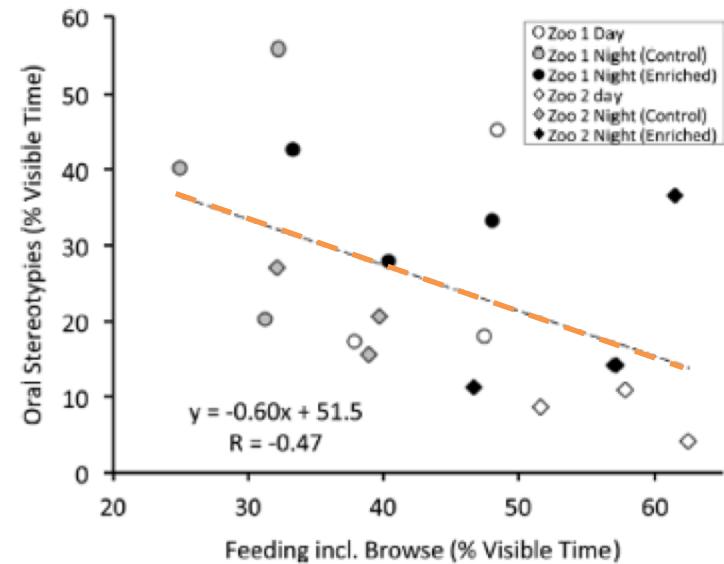
Zoo Biology 35: 157–166 (2016)



Nocturnal Behavior in Captive Giraffe (*Giraffa camelopardalis*)—A Pilot Study

Graham Duggan,^{1,2,*} Charlotte C. Burn,³ and Marcus Clauss⁴

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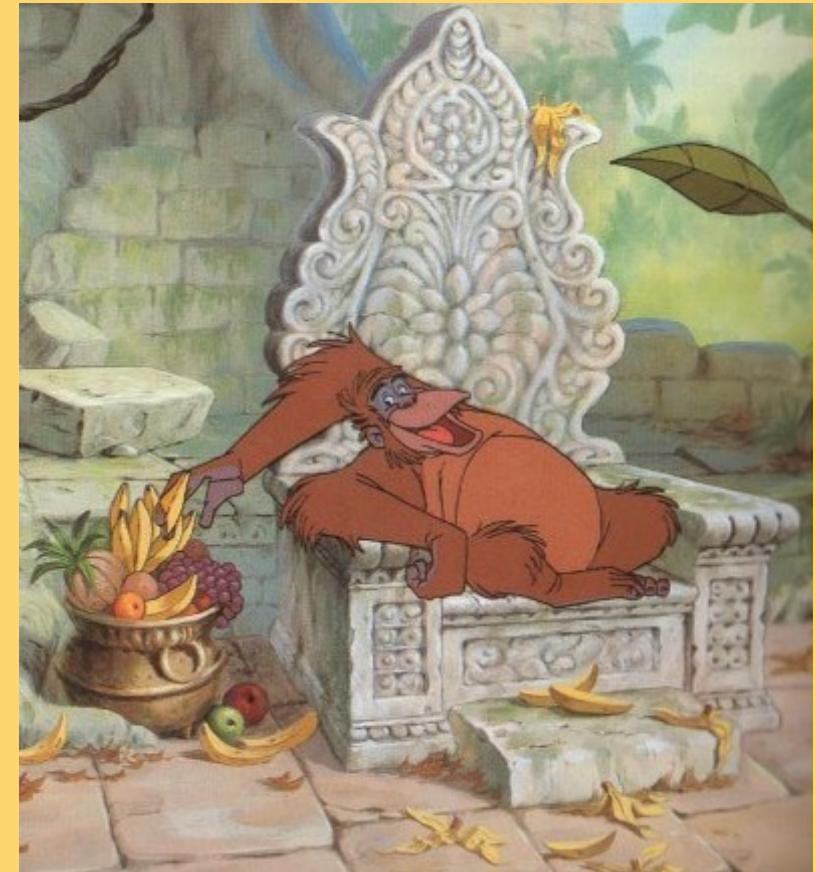
Why is feeding important ?

- to meet nutritional and physiological needs / avoid illness and malfunction
- to meet behavioral needs
- to tell a story to
 - your visitors
 - your employees



What is your story ?

“Wild animals are like humans – the world is as Walt Disney showed it.”





What is your story ?


DWW
 AnimalWelfareWeb.nl

Sugars and other nutrients in produce (of fruits and vegetables)

All values expressed as g/kg wet weight, unless otherwise stated.

Fruits											Vegetables														
Banana <i>Musa acuminata</i>											Carrot <i>Daucus carota</i>														
Energy MJ	Dry Matter	NDF	ADF	Crude Protein	Fat	Ca	P	Mg	Fe	Vit A RE	Vit E o-TE	Vit C	Energy MJ	Dry Matter	NDF	ADF	Crude Protein	Fat	Ca	P	Mg	Fe	Vit A RE	Vit E o-TE	Vit C
3.4	234	28.8	6.6	13.3	12.4	0.04	0.27	0.28	0.002	44.2	5.5	0.14	1.6	115	11.2	10.2	6.8	4	0.36	0.29	0.12	0.004	9170	5.5	0.02
Apple <i>Malus domestica</i>											Sweet potato <i>Ipomoea batatas</i>														
																									
Energy MJ	Dry Matter	NDF	ADF	Crude Protein	Fat	Ca	P	Mg	Fe	Vit A RE	Vit E o-TE	Vit C	Energy MJ	Dry Matter	NDF	ADF	Crude Protein	Fat	Ca	P	Mg	Fe	Vit A RE	Vit E o-TE	Vit C
2.4	143	14.6	8.6	4.3	8.3	0.04	0.17	0.04	0.001	20.8	5.5	0.1	1.6	115	11.2	10.2	6.8	4	0.36	0.29	0.12	0.004	9170	5.5	0.02
Orange <i>Citrus x sinensis</i>											Celeri <i>Apium graveolens</i>														
																									
Energy MJ	Dry Matter	NDF	ADF	Crude Protein	Fat	Ca	P	Mg	Fe	Vit A RE	Vit E o-TE	Vit C	Energy MJ	Dry Matter	NDF	ADF	Crude Protein	Fat	Ca	P	Mg	Fe	Vit A RE	Vit E o-TE	Vit C
2.2	130	14.3	9.2	7.8	4.9	0.35	0.22	0.1	0.001	40	5.5	0.6	3.0	197	39.4	9.7	8.3	11	0.45	0.47	0.15	0.009	3730	-	0.26
Kiwi <i>Actinidia deliciosa</i>											Spinach <i>Spinacia oleracea</i>														
																									
Energy MJ	Dry Matter	NDF	ADF	Crude Protein	Fat	Ca	P	Mg	Fe	Vit A RE	Vit E o-TE	Vit C	Energy MJ	Dry Matter	NDF	ADF	Crude Protein	Fat	Ca	P	Mg	Fe	Vit A RE	Vit E o-TE	Vit C
2.5	156	25.3	19.7	12.9	8.3	0.32	0.33	0.13	0.003	314	5.5	0.65	1.1	83	16.7	9.7	32.1	6.6	1.29	0.41	0.26	0.05	3400	29	0.52
Papaya <i>Carica papaya</i>											Endive <i>Cichorium endivia</i>														
																									
Energy MJ	Dry Matter	NDF	ADF	Crude Protein	Fat	Ca	P	Mg	Fe	Vit A RE	Vit E o-TE	Vit C	Energy MJ	Dry Matter	NDF	ADF	Crude Protein	Fat	Ca	P	Mg	Fe	Vit A RE	Vit E o-TE	Vit C
2.1	135	18.5	16.5	18.4	4.7	0.25	0.1	0.22	0.007	197	-	0.55	0.6	62	11	8.9	13	2	0.52	0.28	0.15	0.008	1030	-	0.07

Photos and design by Emile Prins, 2012.

Information used from Danish Food Composition Table and Schmidt et al., (2005).

© VHL Animal Management / Animal Welfare Web/E.F. Prins

University of Applied Sciences
WUR LARENSTAD

EAT4LIFE

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What is your story ?

Fruits

	Water	Rest	protein	available carbohydrates	calcium	phosphorus
	%	%		%		%
----- dry matter -----						
Honey	18.6	81.4	0.5	92.3	0.1	0.2
Rock melon	87.0	13.0	6.9	92.5*	0.5	1.6
Water melon	93.2	6.8	8.8	90.5*	1.5	1.6
Ananas	85.3	14.7	3.1	89.3	1.1	0.6
Grapes	81.1	18.9	3.6	85.2	1.0	1.1
Apple	85.3	14.7	2.3	84.3	0.5	0.8
Dried dates	20.2	79.8	2.3	83.1	0.8	0.7
Cherry	82.8	17.2	5.2	82.6	1.0	1.2
Banana	73.9	26.1	4.4	82.0	0.3	1.1
Grapefruit	89.0	11.0	5.5	81.4	1.6	1.5
Pear	84.3	15.7	3.0	80.6	0.6	1.0
Peach	87.5	12.5	6.1	75.5	0.6	1.8
Mango	82.0	18.0	3.3	71.1	0.7	0.7
Plum	83.7	16.3	3.7	70.0	0.9	1.1
Apricot	85.3	14.7	6.1	67.6	1.1	1.4
Gooseberry	87.3	12.7	6.3	66.9	2.3	2.4
Kiwi	83.8	16.2	6.2	66.5	2.3	1.9
Fig	80.2	19.8	6.6	65.2	2.7	1.6
Orange	85.7	14.3	7.0	64.3	2.9	1.6
Strawberry	89.5	10.5	7.8	61.4	2.5	2.8
Black currant	81.3	18.7	6.8	53.3	2.5	2.1
Red currant	84.7	15.3	7.4	48.6	1.9	1.8
Blueberry	84.6	15.4	3.9	47.8	0.6	0.8
Blackberry	84.7	15.3	7.8	46.7	2.9	2.0
Raspberry	84.5	15.5	8.4	44.6	2.6	2.8
Guava	83.5	16.5	5.5	40.6	1.0	1.9
Papaya	87.9	12.1	4.3	19.8	1.7	1.4
Avocado	68.0	32.0	5.9	1.3 (due to high fat content)	0.3	1.2

*minimum

Source: Souci/Fachmann/Kraut „Die Zusammensetzung der Lebensmittel – Nährwert-Tabellen 1989/90“. 4. Auflage, Wiss. Verlagsgesellschaft Stuttgart

Vegetables

	Water	Rest	protein	available carbohydrates	calcium	phosphorus
	%	%		%		%
----- dry matter -----						
Sweet potato	69.2	30.8	5.3	94.0*	1.1	1.5
Manioc/Tapioca	63.1	36.9	2.7	86.9	1.0	1.0
Beetroot	88.8	11.2	13.7	76.9	2.6	4.0
Potato raw/cooked	77.8	22.2	9.2	69.4	0.4	2.3
Cucumber	96.8	3.2	18.8	64.7	4.7	7.2
Tomato	94.2	5.8	16.4	59.5	2.4	4.5
Pumpkin	91.3	8.7	12.6	54.9	2.5	5.1
Green beans	90.3	9.7	24.6	54.5	5.9	3.9
Onion	87.6	12.4	10.1	46.7	2.5	3.4
Kohlrabi	91.6	8.4	23.1	45.8	8.1	5.9
Carrot	88.2	11.8	8.3	41.8	3.5	3.0
Chicoree	94.4	5.6	23.2	41.4	4.6	4.6
Squash	88.7	11.3	12.4	40.6	2.4	3.8
Radish	94.4	5.6	18.8	39.6	6.1	4.7
Aubergine	92.6	7.4	16.8	35.9	1.8	2.9
Sweet pepper	91.0	9.0	13.0	35.7	1.2	3.2
Celery stalks	92.9	7.1	16.9	30.7	11.3	6.8
Cauliflower	91.6	8.4	29.3	30.2	2.4	6.4
Chinese cabbage	95.4	4.6	25.9	29.1	8.7	6.5
Leek	89.0	11.0	20.4	29.0	7.9	4.2
Broccoli	89.7	10.3	32.0	27.4	10.2	8.0
Zucchini	92.2	7.8	20.5	25.6	3.8	2.9
Brussels sprouts	85.0	15.0	29.7	25.1	2.1	3.6
Savoy cabbage	90.0	10.0	29.5	24.1	4.7	5.6
Lettuce	95.0	5.0	25.0	22.0	7.4	6.6
Kale/Green cabbage	86.3	13.7	31.4	21.7	15.5	6.4
Fennel	86.0	14.0	17.4	20.1	7.8	3.6
Celery root	88.6	11.4	13.6	19.7	6.0	7.0
Girasole	78.9	21.1	11.6	19.0	0.5	3.7
Artichoke	82.5	17.5	13.7	16.6	3.0	7.4
Field salad/Lamb's lettuce	93.4	6.6	27.9	10.6	5.3	7.4
Mangold	92.2	7.8	27.3	8.8	12.8	5.0
Spinach	91.6	8.4	30.0	7.3	15.0	6.5
Parsley	81.9	18.1	24.5	7.2	13.5	7.1
Endive	94.3	5.7	30.7	5.3	9.5	9.5

*minimum

Source: Souci/Fachmann/Kraut „Die Zusammensetzung der Lebensmittel – Nährwert-Tabellen 1989/90“. 4. Auflage, Wiss. Verlagsgesellschaft Stuttgart



What is your story ?

“We show you that you can maintain wild animals in human care with diets that do not resemble the ones they eat in the wild.”

“We show you on what animals can actually survive.”

“We know commercial fruits are not natural diet items but we want to promote the use of apples anyhow.”

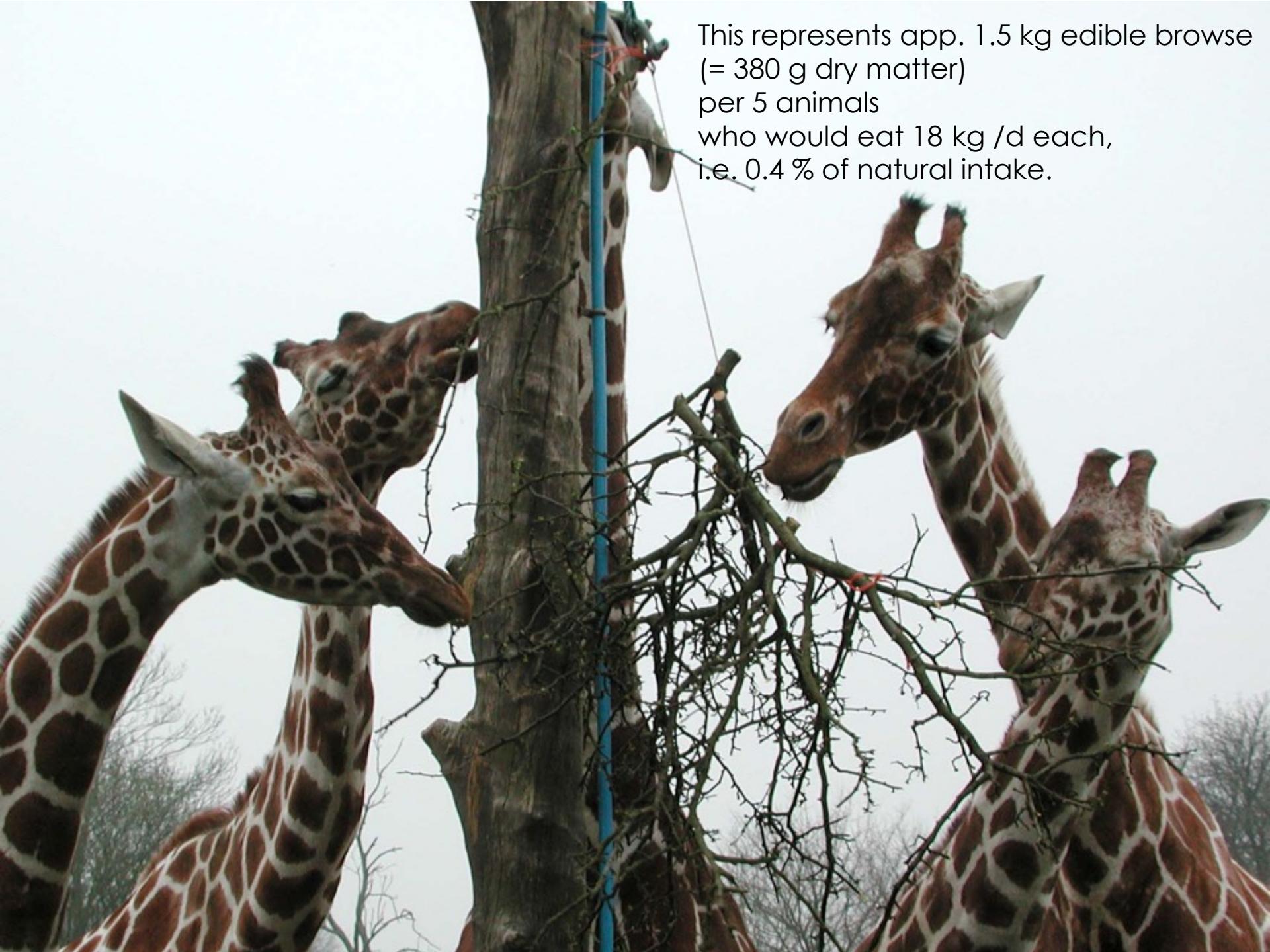
“Conservation has nothing to do with trying to reproduce natural diets.”

“Long live Granny Smith!”



What is your story ?

“It is our aim to feed our animals a diet that consists of about 0.5 % natural diet items.”

A photograph showing four giraffes (three adults and one juvenile) feeding from a tall, weathered wooden post. The post is suspended by a blue strap and has several branches hanging from its top, which the giraffes are eating. A white line points from the text to the hanging branches.

This represents app. 1.5 kg edible browse
(= 380 g dry matter)
per 5 animals
who would eat 18 kg /d each,
i.e. 0.4 % of natural intake.



Daily allotment for one okapi (fed browse only)
(photo J. Hummel)



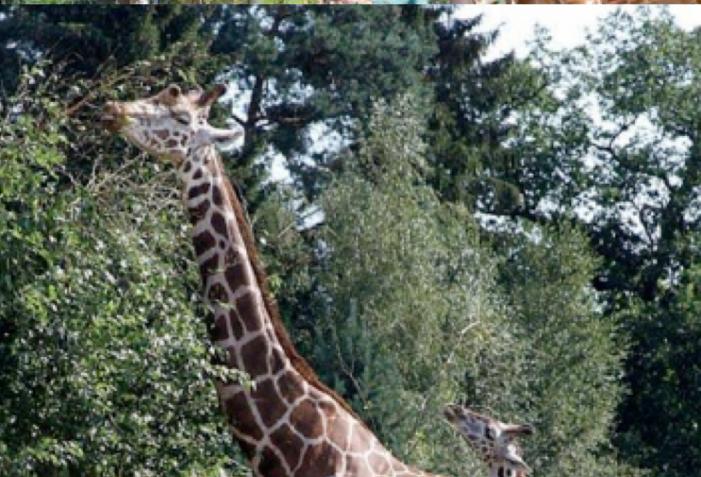
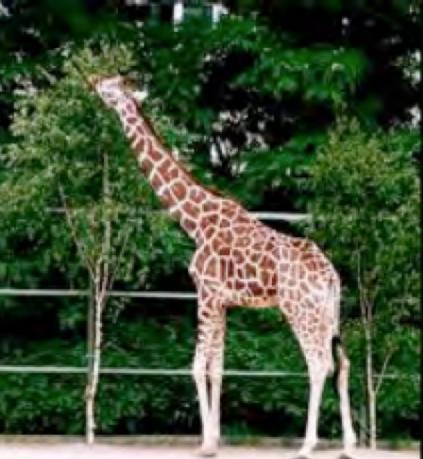
EAZA
Husbandry & Management
Guidelines



Giraffa camelopardalis

2006

Amount of browse fed to a group of giraffe (4 adult and 3 half-grown) 2 times a week (roughly estimated, this amount would fulfil the total energy needs of 3 adult giraffes for one day, if consisting of a variety of well palatable browse species)





What is being fed?

Research article

Feeding practices for captive giraffes (*Giraffa camelopardalis*) in Europe: a survey in EEP zoos

I. Gussek¹, S. Hirsch², M. Hartmann², K.-H. Südekum¹ and J. Hummel³

Journal of Zoo and Aquarium Research 5(1) 2017

Table 4. Combinations of concentrate feeds fed in the percentage of respondent zoos

There are very good pelleted diets



Our 5 herbivore feeds:

Elephant Product number 958.60 3715.PD.525

- Supplementary feed high in fiber
- Specially designed for prophylaxis against obesity
- With linseed products for natural omega-3 fatty acids
- Supplemented with vitamin E, biotin and zinc, as well as other vitamins and trace elements
- The elephant's high requirement of vitamin E and D is particularly respected



Grazer Product number 957.60 3697.PD.525

- Balanced fiber composition for optimal digestive health specifically suitable for grazers
- Rich in celluloses
- Well suitable for equids owing to low content of expanding fibers and supplementation with B vitamins
- Protein content adapted to the lower requirement of grazers
- High levels of vitamin E and organic selenium
- Biotin supplemented for horn and fur
- No mineral iron is substituted
- With linseed products for a naturally high content of omega-3 fatty acids
- Bicarbonate for the prevention of ruminal acidosis



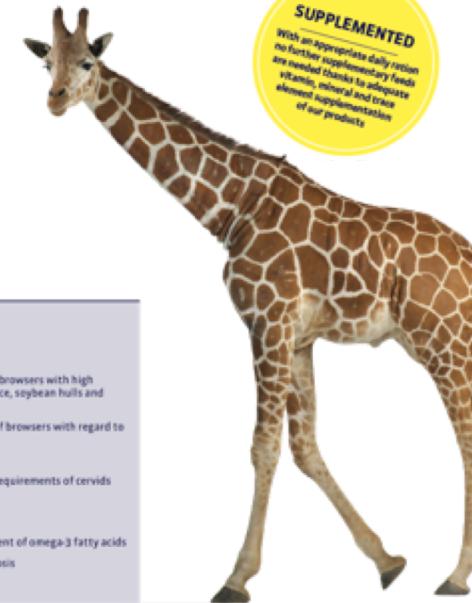
Grazer Cu-controlled Product number 958.60 3698.PD.525

- Copper content of only 9 ppm specifically for copper sensitive herbivores
- Except for the reduced copper content, the feed offers the same special features and advantages as the grazer feed

ALL FEEDS
contain little grain, thus
allowing for low starch
contents - a strong support
for ruminal and intestinal
health

Browser Product number 959.60 3699.PD.525

- Balanced fiber composition, highly suitable for browsers with high contents of fermentable fiber from apple pomace, soybean hulls and beet pulp for a healthy gastrointestinal tract
- Protein content adapted to the requirements of browsers with regard to the lower protein content of European alfalfa
- High levels of vitamin E and organic selenium
- Copper supplemented also suitable for higher requirements of cervids
- Biotin supplemented for horn and fur
- No mineral iron is substituted
- With linseed products for a naturally high content of omega-3 fatty acids
- Bicarbonate for the prevention of ruminal acidosis



SUPPLEMENTED
With an appropriate daily ration
no further supplementary feeds
are needed thanks to adequate
vitamin, mineral and trace
element supplementation
of our products

Rhino and tapir Product number 969.60 3695.PD.525

- A special formulation low in iron with naturally low-iron raw materials and manufactured without additional iron supplementation for black rhinos and tapirs
- Adapted to the requirements of browsers by using high content of alfalfa
- High content of pectins through beet pulp and grape marc to supply fermentable fibers
- Supplemented with vitamin E and selenium





There are very good pelleted diets

Application:

Which product is best suited for your animal?

Among other factors, the choice of a supplementary diet depends largely on the additional fed roughage and its composition as well as the quantities of the single components of the daily ration. The following lists are not to be considered as complete. Talk to our experts for further information.



Our 5 herbivore feeds:

Elephant	Browsing browser 100% browser
<ul style="list-style-type: none"> ✓ Browsing browser ✓ High energy diet ✓ High protein diet ✓ High water requirement ✓ High energy requirement ✓ High protein requirement ✓ High water requirement 	



Browser	Browsing browser 100% browser
<ul style="list-style-type: none"> ✓ Browsing browser ✓ Highly mobile browser ✓ High energy diet ✓ High protein diet ✓ High water requirement ✓ High protein requirement ✓ High energy requirement ✓ High water requirement 	



Grazer

Grazer	Browsing browser 100% browser
<ul style="list-style-type: none"> ✓ Browsing browser ✓ High energy diet ✓ High protein diet ✓ High water requirement ✓ High energy requirement ✓ High protein requirement ✓ High water requirement 	



Rhino and tapir

Grazer Co-controlled	Browsing browser 100% browser
<ul style="list-style-type: none"> ✓ Browsing browser ✓ Co-controlled browser ✓ High energy diet ✓ High protein diet ✓ High water requirement ✓ High energy requirement ✓ High protein requirement ✓ High water requirement 	

GRAZERS			INTERMEDIATE FEEDERS	BROWSERS	
Elephant	Grazer	Grazer Cu-controlled	Browser	Rhino and tapir	
Product no. 368.60 3715.PD.525	Product no. 367.69- 3699.PD.525	Product no. 368.60 3698.PD.525	Product no. 369.60 3699.PD.525	Product no. 369.60 3695.PD.525	Product no. 369.60 3695.PD.525
Asian Elephant	Buffalo	Wild Sheep	Muskox	Giraffe	Black Rhinoceros
African Elephant	Banteng	Llama	Eland Antelope	Okapi	Sumatran Rhinoceros
	Wild Cattle	Alpaca	Impala	Bushbuck	Indian Rhinoceros
	Wildebeest	Vicuña	Thomson's Gazelle	Nyala	Javan Rhinoceros
	Waterbuck	Guanaco	Springbok	Sitatunga	Tapirs
	Oryx		Pronghorn	Gerenuk	
	Oribi		Saiga Antelope	Duiker	
	Topi		Dama Gazelle	Suni	
	Blackbuck		Ibex	Dikdik	
	Bactrian Camel		Goats	Klipspringer	
	Dromedary		Chamois	Kudu	
	Père David's Deer		Wapiti	Muntjac	
	Zebra		Sika Deer	Roe Deer	
	Hippopotamus		Red Deer	Moose	
	White Rhinoceros		Mule Deer	Tree-kangaroos	
	Eastern Grey Kangaroo		Rock-wallabies	Small Wallabies	
	Red Kangaroo			Reindeer*	
				Bongo*	
				Pigmy Hippopotamus*	
				Water Deer*	

There are very good pelleted diets



HERBIVOREN

Browser

Futternummer: 3699

Geeignet für: Browser Zoo Herbivoren, z.B. Giraffen, Okapis, Rehe, Elche, Ducker, sowie Intermediate Feeders wie Hirsche, Ziegenartige etc.

IHRE VORTEILE

- ◊ Speziell für Browser's geeignete Faserzusammensetzung mit hohem Anteil an fermentierbarer Faser durch Apfelfröscher, Rübenschmitzel und Haferkleie
- ◊ Proteingehalt an den Bedarf der Browser angepasst mit Beachtung der in Europa tieferen Proteingehalte im Luzerneheu
- ◊ Wenig Getreide und somit niedriger Gehalt an Stärke
- ◊ Ohne Soja- und Palmölprodukte
- ◊ Hoher Gehalt an Vitamin E
- ◊ Organische Selenquelle
- ◊ Kupfer-supplementiert für den höheren Bedarf der Hirsche
- ◊ Biotin supplementiert für Horn und Fell
- ◊ Kein mineralisches Eisen substituiert
- ◊ Leinsaatprodukte für natürliche Omega-3-Fettsäuren
- ◊ Bicarbonat zur Vorbeugung der Pancreacisose [1%]
- ◊ Dank Vitamin-, Mineralstoff- und Spurenelementsupplementierung sind bei geeigneter Rationszusammensetzung keine zusätzlichen Ergänzungsfutter nötig

Gerne erarbeiten wir mit Ihnen einen individuellen Fütterungsvorschlag



Futterabbildung im Originalmaßstab.
Farben können vom Produkt abweichen

FÜTTERART, FORM, LIEFERMENGEN

- ◊ Ergänzungsfuttermittel
- ◊ Form: Pellet 4-5 mm und 8 mm rund
- ◊ Liefermengen: 25 kg Papiersäcke
Paletten à 750 kg
- ◊ Produktnummer: 3699.PA.S25 / 3699.PD.S25



HERBIVOREN

Browser

Futternummer: 3699

FUTTERANGABEN

Hauptnährstoffe (%)	Spurenelemente (mg/kg)	Aminosäuren (%)
Trockensubstanz	89 Eisen 500 Arginin 1.19	
Rohprotein	20 Zink 204 Lysin 1.04	
Rohfett	3 Kupfer 33 Methionin 0.38	
Rohfaser	20 Jod 2 Methionin + Cystin 0.70	
Rohasche	9 Mangan 122 Tryptophan 0.27	
NFE	37 Selen 0.7 Threonin 0.85	
NDF	36 Kobalt 1.1	
ADF	24	
Stärke	5	
Zucker	4	

Vitamine (zugesetzt, mg/kg)

Energie (MJ/kg)	Vitamin A (IU/KG)	Vitamin D3 (IU/KG)	Vitamin E	Vitamin B1	Vitamin K3	Vitamin B2	Vitamin B6	Vitamin B12	Nicotinsäure	Pantothensäure	Folsäure	Biotin	Cholin	Vitamin C
Bruttoenergie	16.5	10500	1500	8.0	11	10	7	0.04	80	32	1.4	7	150	15
Umsetzbare Energie	6.4	1500	1800	11	11	10	7							
Verdauliche Energie	10.7	1800	11	10	7	7	7							

Mengenelemente (‰)

Calcium	1.3	Pantothensäure	32	
Phosphor	0.7	Folsäure	1.4	
Magnesium	0.3	Biotin	7	
Natrium	0.6	Cholin	150	
Kalium	1.1	Vitamin C	15	
Chlor	0.3			

Zusammensetzung

Luzernemehl, Sonnenblumenmehl, Haferkleie, Leinsaatprodukte, Kartoffelprotein, Rübenschmitzel, Apfelfröscher, Weizen, Mineralstoff- und Vitaminprämix inkl. Bicarbonat, Zellulose, Melasse, Strohmehl.

Bemerkungen

- ◊ Angegebene Gehalte sind berechnete Mittelwerte bezogen auf luftgetrocknete Substanz.
- ◊ Bruttoenergie und umsetzbare Energie berechnet nach Angaben aus Kampfheus et al. 2009; verdauliche Energie berechnet nach Angaben aus NRC Horses 2007
- ◊ Nährstoffgehalte unterliegen natürlichen Schwankungen der Rohstoffe und deren Herstellungsprozessen.

UNSERE FÜTTERUNGSEMPFEHLUNG

- ◊ Das Futter eignet sich zur Ergänzung einer Ration auf Raufutterbasis [je nach Spezies Luzerneheu, Grasheu, Laub, etc.]
- ◊ Wasser immer zur freien Verfügung stellen
- ◊ Richtwert: 0.5-1.5% vom Körpergewicht pro Tag plus Heu zur freien Verfügung
- ◊ Max. 60% der Trockensubstanz der Ration
- ◊ Nicht geeignet für Schafe und andere Kupfer empfindliche Herbivoren (Gesamtgehalt ca. 33ppm)
- ◊ Weniger geeignet für Pferdeartige und Tiere mit Tendenz zur Schlundverstopfung wegen quellenden Faseranteilen (v.a. Rübenschmitzel). Falls das Futter doch verarbeitet wird, sollte es zuvor eingeweicht werden.

Gerne erarbeiten wir mit Ihnen einen individuellen Fütterungsvorschlag für die betreffende Tierart

Quellen:
Kampfheus et al. 2009, Supplamente zu Vorlesungen und Übungen in der Tierernährung, 11. Auflage, M. & H. Schaper, Hannover
Litzénich, B. A., & Ward, A. M. (September 1997). Hay and Pellet Rations: Considerations in Feeding Ungulates. Nutrition Advisory Group Handbook, Fact Sheet 006.



Why do giraffes eat ‘too little’?

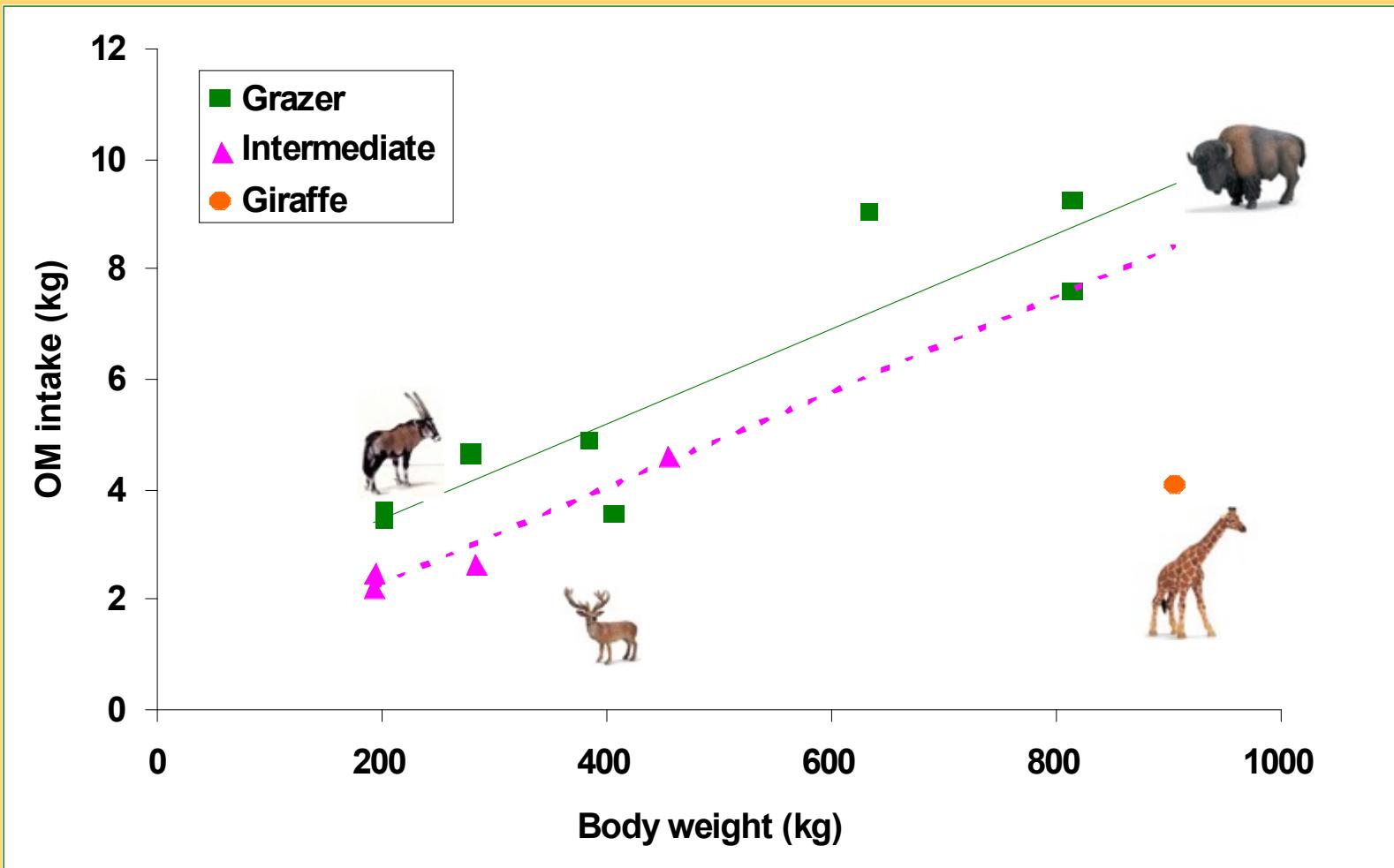
Their diet is too energy-dense.

High-energy: Grains and grain-based pellets,
fruit/coloured vegetables.

Because they do not like the roughage they
are offered.



Roughage I: giraffes do not eat grass hay





Roughage II: Lucerne hay is accepted

Lucerne hay quality is paramount.
This is not the item to save money on, and
someone who knows hay has to do the buying.

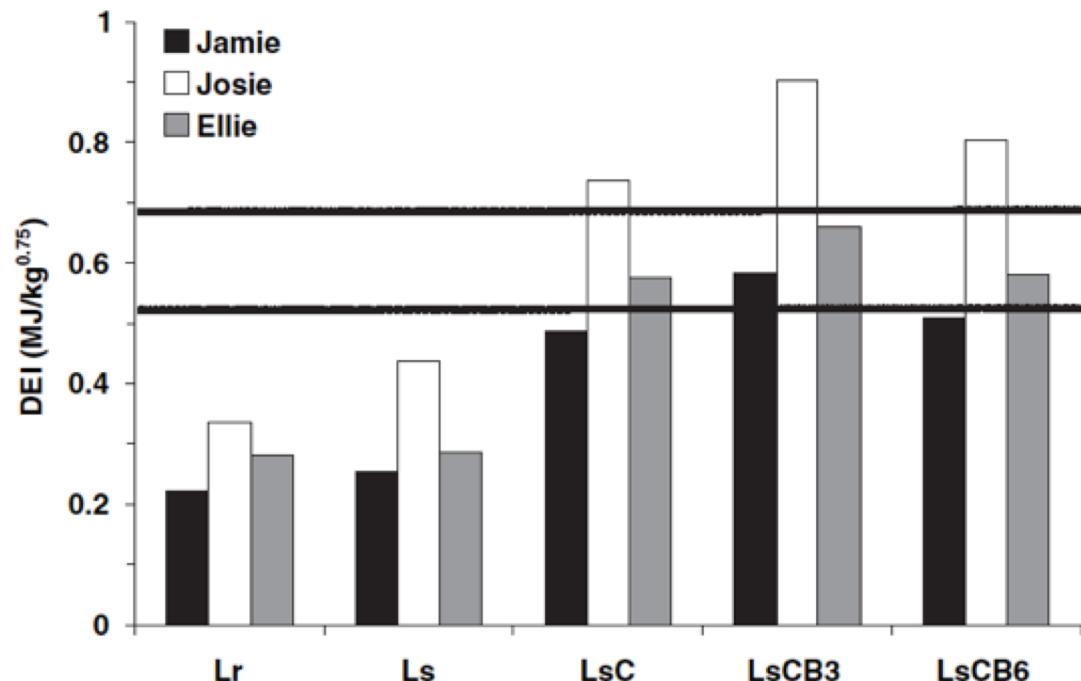




Roughage II: Lucerne hay is accepted but not the solution

Energy and Fibre Intake in a Group of Captive Giraffe (*Giraffa camelopardalis*) Offered Increasing Amounts of Browse

J.-M. HATT^{1,8}, D. SCHaub¹, M. WANNER², H.-R. WETTSTEIN³, E. J. FLACH⁴, C. TACK⁴, M. HÄSSIG⁵, S. ORTMANN⁶, J. HUMMEL⁷ and M. CLAUSS¹
J. Vet. Med. A 52, 485–490 (2005)



Roughage II: Lucerne hay is accepted but not the solution

Aktivitätsbudgets von Rothschildgiraffen (*Giraffa camelopardalis rothschildi*)

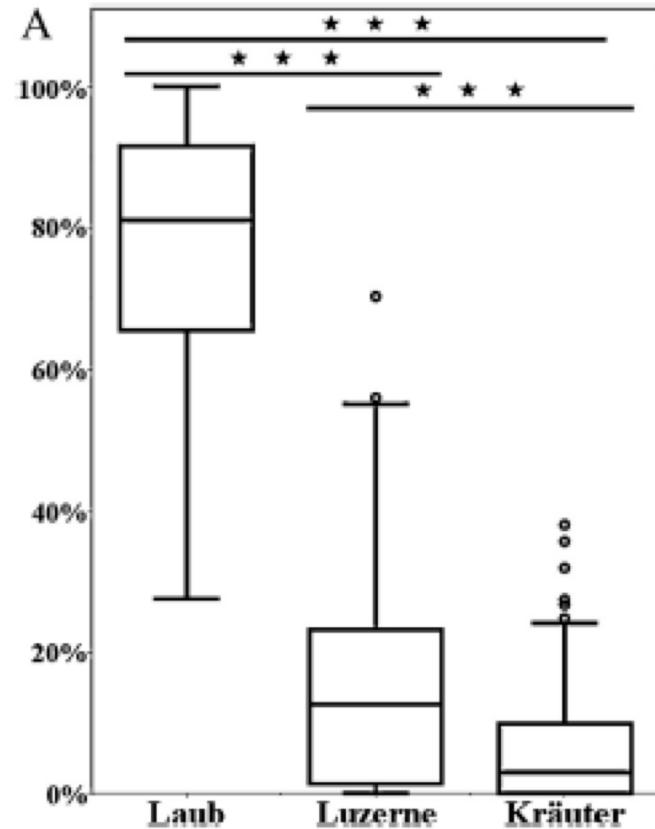
Lydekker, 1903) in der „Zoom Erlebniswelt Gelsenkirchen“

Dominik Schüßler^a, Wolf-Dietrich Gürtler^{b,*},
Hartmut Greven^{a,*}

Zool. Garten N.F. 84 (2015) 61–74

Auf der Außenanlage stehen den Giraffen zu jeder Tageszeit Luzerneheu (*Medicago* sp.) und frische Äste mit Laub (je nach Saison *Salix* sp., *Acer* sp., *Fraxinus* sp., *Quercus* sp., *Corylus* sp., *Robinia* sp.) zur Verfügung. Zusätzlich fressen die Giraffen zwischen

Die Giraffen in Gelsenkirchen verbrachten durchschnittlich etwa 48% der Tagesaktivität mit der Nahrungsaufnahme. Verglichen mit den aus der Literatur bekannten Angaben für Giraffen im Zoo ist der von uns ermittelte Anteil deutlich höher. Dies liegt ganz offensichtlich an der Fütterung. In Studien an Giraffen im Zoo, in denen diese Zeit mit 18% – 27% angeben wird, wurde Laub nur ergänzend zu einer Ernährung von Heu und Futterkonzentraten (Veasey et al., 1996; Hosie & Turner, 2000; Del Castillo et al., 2005) oder gar nicht gefüttert (Baxter & Plowman, 2001). Steht den Giraffen jedoch immer Laub zur Verfügung, ist die Zeit, in der die Tiere fressen, bedeutend länger (vgl. auch Garry, 2012).



What is being fed ?

Research article

Feeding practices for captive giraffes (*Giraffa camelopardalis*) in Europe: a survey in EEP zoos

I. Gussek¹, S. Hirsch², M. Hartmann², K.-H. Südekum¹ and J. Hummel^{3*}

Journal of Zoo and Aquarium Research 5(1) 2017

Table 3. Combinations of forage fed in the percentage of respondent zoos.

Lucerne hay/ chopped/ ensiled/molassed	Grass hay/ haylage/silage	Grass-clover hay	Fresh forage (lucerne, grass,nettles, blackberry, thistle, rose leaves)	Browse fresh/ frozen/dried/ensiled	Fed in % of zoos
*				*	40
*				*	26
*	*		*	*	19
*	*	*	*	*	5
*	*	*	*	*	4
*	*	*	*	*	2
*	*	*	*	*	1
*	*	*	*	*	1
*	*	*	*	*	1
*	*	*	*	*	1

Everyone gives some browse, but how
much ?



What is being fed ?

Research article

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Table 9. Feeding of forage as found by Hummel et al. (2006d) compared to information from the participating zoos in the present study.

	Hummel et al. (2006d)	Present study
<i>Grass/lucerne</i>		
Lucerne hay	81%	89%
Grass hay	40%	27%
Ensiled lucerne/grass	—	4%
<i>Browse</i>		
Fresh browse (trees and branches)	80%	96%
Dried/ensiled/frozen browse	4%	47%
<i>Fresh forage</i>		
Grass	53%	31%
Lucerne	—	19%
Nettles, thistles, blackberry, rose leaves	—	12%

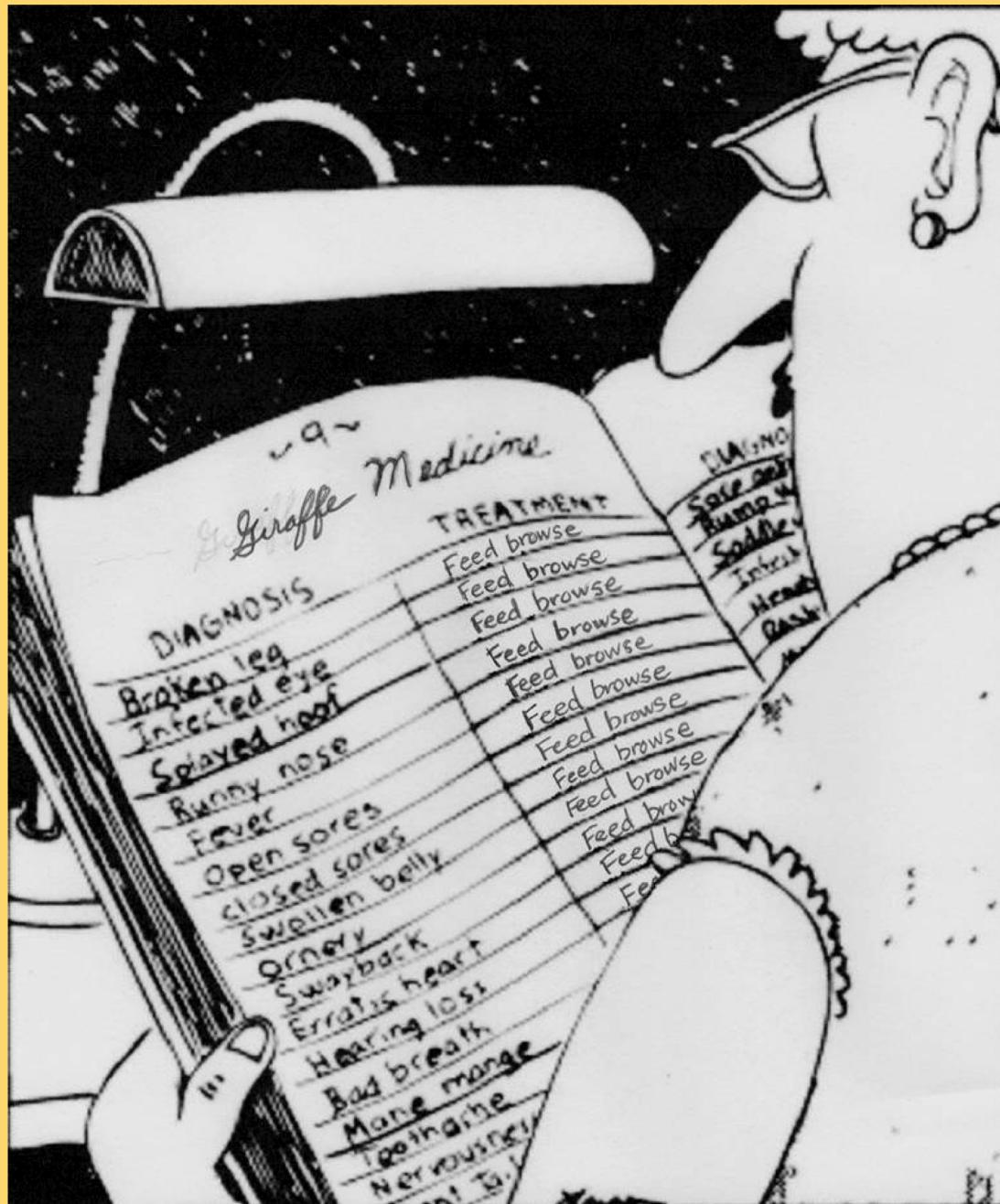






Roughage II: Lucerne hay is accepted but not the solution

No modern giraffe husbandry story without a concept for a consistent, generous provision with browse.



B. Wolfe

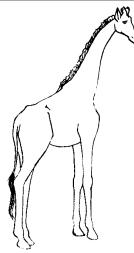


Monitor body condition



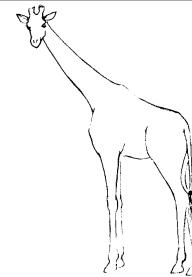
Score 1

Neck & Shoulders	Emaciated; Bone structure is easily visible; No fat
Withers	Emaciated; Bone structure is easily visible; No fat
Loin & Back	Emaciated; Spinous processes are easily identifiable
Tailhead & Hips	Hooks and pins are very prominent
Ribs	Emaciated; Rib spacing appears wide and depressed



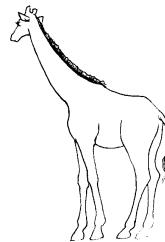
Score 2

Neck & Shoulders	Neck is thin; Decreased girth
Withers	Thin; Bone structure is evident
Loin & Back	Spinous processes are not individually identifiable, but spine is still prominent; Transverse processes faintly discernible
Tailhead & Hips	Hooks are round, but still evident; Pins may be slightly discernible
Ribs	Ribs are still discernible, but fat is discernible by touch



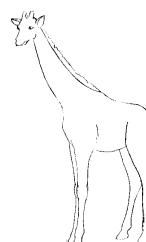
Score 3

Neck & Shoulders	Neck is thick; Shoulders are flat
Withers	Withers has fat deposits; Decreasing visibility of bone structure
Loin & Back	Back is sloped to withers
Tailhead & Hips	Fat is present around tailhead; Hips are flat
Ribs	Ribs are not visible, but discernible by touch



Score 4

Neck & Shoulders	Neck is thick; Fat deposits are evident; Shoulders are slightly rounded
Withers	Fat deposits are evident
Loin & Back	Fat deposits are present; Back appears flatter
Tailhead & Hips	Hips are rounded
Ribs	Ribs are not visible; Fat deposits may be evident



Score 5

Neck & Shoulders	Fat is evident along neck; Bulging fat; Neck is thick; Neck blends into shoulder; Shoulders are rounded
Withers	Fat deposits make withers appear flatter/ less discernible
Loin & Back	Wide back; Patchy fat; Back is flat
Tailhead & Hips	Hips/thighs are very round
Ribs	Fat deposits may be present, easily evident

