



Example for feeding management plan: Meerkats



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**University of
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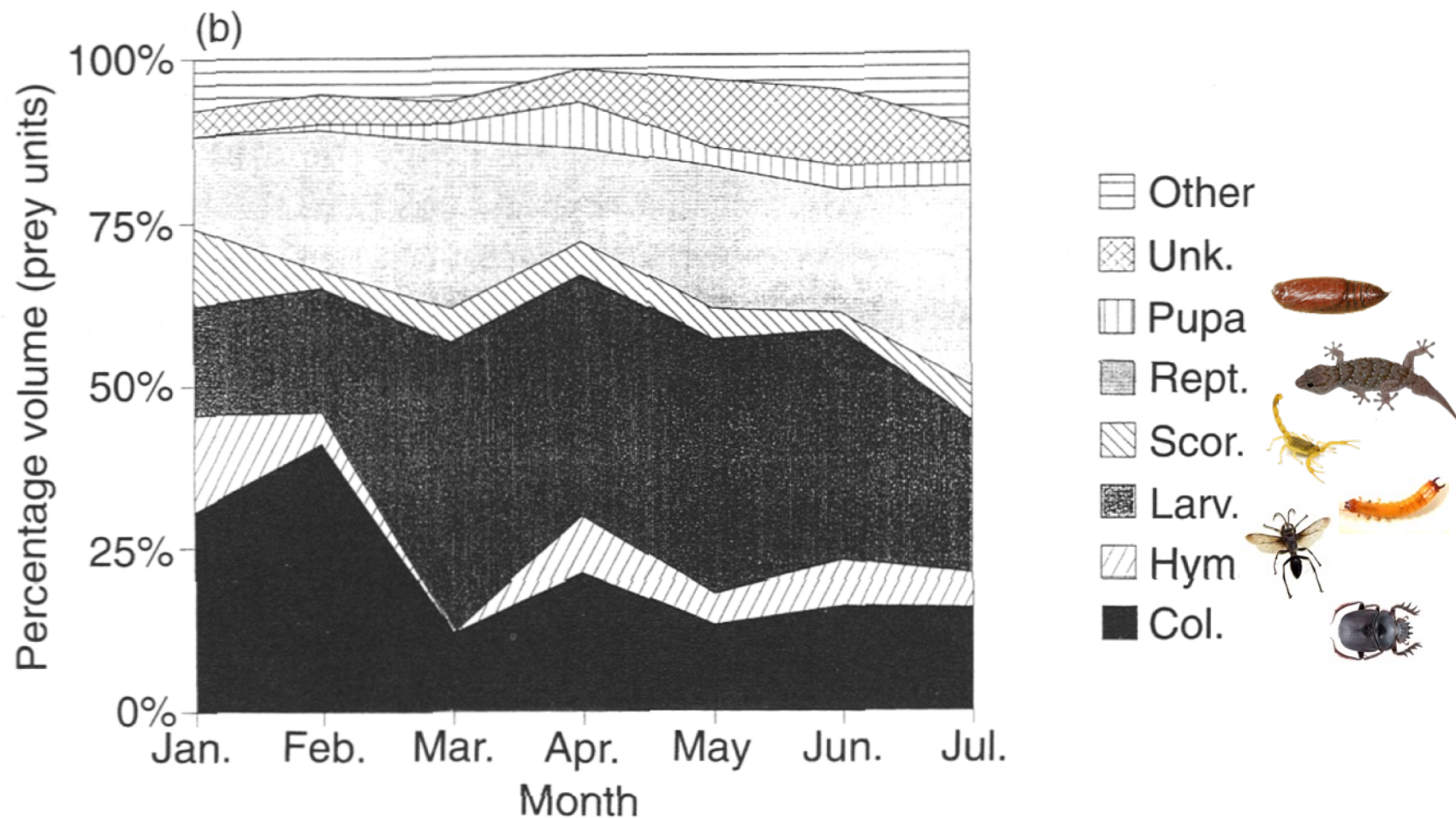
Meerkats

1. Natural diet



Diet and foraging behaviour of group-living meerkats, *Suricata suricatta*, in the southern Kalahari

S. P. DOOLAN^{*1} AND D. W. MACDONALD





Meerkats

1. Natural diet – insectivore, with sparse vertebrate prey
2. Feeding mode – permanent searching with guards
3. Reported problems in captivity



**MONGOOSE,
MEERKAT, and FOSSA**
(*Herpestidae/Eupleridae*)
CARE MANUAL


CREATED BY THE
AZA Small Carnivore Taxon Advisory Group
IN ASSOCIATION WITH THE
AZA Animal Welfare Committee

Meerkat: Taurine has been determined to be a necessary component to the diet of meerkats; lack of taurine may result in enlarged hearts and related complications. Diets should contain a form of cat food (which is rich in taurine), mice (which also contain taurine), or taurine dietary supplements (K. Kimble, personal communication, 2004 & 2005). See Appendix F for nutrient descriptions and Chapter 6: Veterinary Care for additional information.



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Meerkat: In stable groups, at least one feeding station should be provided for every three individuals. In non-stable groups, or groups in which food aggression has been observed there should be at least one feeding station for each individual in the group with feeding stations distributed in such a way that no one individual can monopolize more than one feeding station. Scattering diet items and/or multiple feeding stations are the most effective ways to feed a large group of meerkats. When offering enrichment items, there should be at least one item for each individual to prevent aggression, and items should be spread out as much as possible.

The primary part of the diet should be fed in the morning, allowing animals to eat throughout the day. Whole prey items (e.g., mice, ribs) and live bugs (mealworms and crickets) can be fed in the afternoon/early evening or at scattered enrichment times. Care should be taken when feeding whole prey that each individual receives an item, thereby minimizing opportunities for aggression (K. Kimble, personal communication, 2004 & 2005).

Initial introduction of food can stimulate aggression amongst meerkats; therefore, it is recommended that they be offered the majority of their diet once daily, in the morning. If a schedule of multiple, small feedings is adopted the provision of less food more often may stimulate unnecessary aggression leading to social unrest (K. Kimble, personal communication, 2004 & 2005).





Meerkats

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4. Do they use latrines? – they do

Latrine distribution and patterns of use by wild meerkats:
implications for territory and mate defence

NEIL R. JORDAN^{*†}, MICHAEL I. CHERRY^{*} & MARTA B. MANSER[‡]

ANIMAL BEHAVIOUR, 2007, **73**, 613–622



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ASSOCIATION
OF
AQUARIANS

*Suricata
suricatta*

Meerkat

Institution C

IAMS adult cat food dry

grams/day

% in diet

32 57.14

Natural Balance Carnivore 10%

10 17.86

Fruit – used apple

3 5.36

Starch – used sweet potato

3 5.36

Veggies – used carrot

7 12.50

Crickets

1 1.79

Total

56 100

Institution D

Royal Canine Vet Diet Low Fat

15 43.23

Fruit/Vegetable – used
apple/carrot

7 20.17

Oat cereal – Cheerios

7 20.17

Fuzzy (6 grams) (2x/wk)

1.7 4.90

Avocado

3 8.65

Insects – used crickets

1 2.88

Total

34.7 100

Institution E

PMI Exclusive chicken dry

8.1 7.69

PMI Exclusive chicken light dry

8.1 7.69

Fruit – used apple

16.1 15.33

Carrot

8.1 7.69

Yam

8.1 7.69

Natural Balance Carnivore 10%

32.4 30.72

Mice

13.7 13.00

Egg, hard-boiled

10.7 10.16

Total

105.3 100

Institution F

Totally Ferret, ground

5 6.39

Fruit/Vegetable

40 51.16

Mealworms

11 14.07

Mouse

4.7 6.03

Egg, hard-boiled

14.3 18.27

Ground Meat – beef

2.8 3.65

Calcium carbonate

0.33 0.42

Total

78.13 100

Institution G

IAMS less active cat dry

20 29.23

ZuPreem Feline canned

10 14.61

Fruit – used apple

8 11.69

Root vegetable – sweet potato

20 29.23

Capelin

2.3 3.34

Mouse

2.1 3.13

Egg, hard-boiled

4.6 6.68

Natural Balance Carnivore 10%

1.1 1.67

Mouse, pinkie

0.28 0.42

Total

68.38 100





Meerkats

Biochemical and Physiological Observations in Meerkats (*Suricata suricatta*) at Two Zoos During a Dietary Transition to a Diet Designed for Insectivores

Lori D. Gutzmann,¹ H. Karl Hill,² and Elizabeth A. Koutsos^{1,3*}

Zoo Biology 28 : 307–318 (2009)

TABLE 1. Reported^a and measured (as fed and dry matter basis)^b nutrient contents of dry dog diet,^c dry insectivore diet,^d and canned exotic feline diet^e

	Dog food ^c			Insectivore diet ^d			Exotic feline diet ^e		
	Reported	Measured		Reported	Measured		Reported	Measured	
	As fed	As fed	DMB ^f	As fed	As fed	DMB ^f	As fed	As fed	DMB ^f
Crude protein (% , min)	21	22	24	28	30	33	16	16	34
Crude fat (% , min)	10	12	13	12	11	12	14	15	33
Crude Fiber (% , max)	4	16	18	13	23	26	1	6	13
Ash (% , max)	—	6.1	6.8	8.0	8.2	9.1	3.0	3.1	6.7
Taurine (%)	—	0.30	0.33	0.26	0.55	0.61	0.05	0.13	0.27

^aGuaranteed analysis from product literature.

^bAs fed, determined by University of Arkansas (Department of Poultry Science, Poultry Science Center, L-209, Fayetteville, Ark, 72701).

^cCountry Value[®] Dog food, Schell & Kampeter, Inc., St. Thomas, MO 65076.

^dMazuri[®] Insectivore, PMI Nutrition International, P.O. Box 66812, St. Louis, MO 63166-6812.

^eZupreem[®] Exotic Feline Diet, Premium Nutritional Products, Inc., Mission KS.

^fDMB = dry matter basis.



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Crude protein (% , min)	21	22	24	28	30	33	16	16	34
Crude fat (% , min)	10	12	13	12	11	12	14	15	33
Crude Fiber (% , max)	4	16	18	13	23	26	1	6	13
Ash (% , max)	—	6.1	6.8	8.0	8.2	9.1	3.0	3.1	6.7
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Does the diet exist in granulated form ?



Mazuri® Insectivore Diet

(Available at www.mazuri.com or through a Mazuri® retailer)

Formula Code – 5MK8 / 5MM3 / 5M2A

Mazuri
EXOTIC ANIMAL NUTRITION

Description

Mazuri® Insectivore Diet is designed to simulate the high protein, high fiber diet of insectivorous animals. It has been tested in a wide range of mammals, birds, reptiles and amphibians as a replacement for all or some of the insect component of the diet. The meal form may be fed via gavage when deemed appropriate under direction of a veterinarian.

Features and Benefits

- **Designed to be complete and balanced for insectivores** - No supplementation necessary.
- **Highly fortified** - May be fed with fruits, greens, etc.
- **Contains fish oil** - Rich source of long-chain omega-3 fatty acids.
- **Contains lecithin** - Rich source of phospholipids.
- **Contains high fiber** - Helps simulate the chitin component of the insectivore's diet.
- **Contains pigments** - For healthy feather pigmentation.
- **Contains taurine** - At levels that meet recommendations for carnivores.
- **Contains natural vitamin E and stabilized vitamin C.**
- **Highly palatable.**

Product Form

Extruded feed: 1/8" round particle.

- 5MM3 - 3 lb. paper sack
- 5MK8 - 25 lb. net weight paper sack
- 5M2A - Meal.
- 1 kg canister
- Other amounts - bagged

Catalog

0065236
0050819
1815822
0050987

Guaranteed Analysis

Crude protein not less than28.0%
Crude fat not less than12.0%
Crude fiber not more than13.0%
Moisture not more than12.0%
Ash not more than8.0%

Ingredients

Poultry By-Product Meal, Ground Soybean Hulls, Whole Wheat, Chicken Meal, Dried Beet Pulp, Ground Brown Rice, Dehulled Soybean Meal, Dried Egg Product, Ground Aspen, Poultry Fat Preserved with BHA, Porcine Animal Fat Preserved with BHA and Citric Acid, Natural Poultry Flavor, Powdered Cellulose, Dried Apple Pomace, Wheat Germ, Fish Meal, Shrimp Meal, Whey, Lecithin, Soybean Oil, Brewers Dried Yeast, Fish Oil, Phosphoric Acid, DL-Methionine, Taurine, Choline Chloride, LAscorbyl-2-Polyphosphate (Stabilized Vitamin C), Pyridoxine Hydrochloride, Salt, Thiamine Mononitrate, Menadione Sodium Bisulfite Complex (source of Vitamin K), D-Alpha Tocopheryl Acetate (Form of Vitamin E), Cholecalciferol, Preserved with Mixed Tocopherols (Form of Vitamin E), Calcium Carbonate, Biotin, Inositol, Rosemary Extract, Vitamin A Acetate, Vitamin B-12 Supplement, Folic Acid, Citric Acid, Riboflavin, Calcium Pantothenate, Nicotinic Acid, Canthaxanthin (color), Ferrous Sulfate, Calcium Iodate, Copper Sulfate, Zinc Oxide, Manganous Oxide, Ferrous Carbonate, Zinc Sulfate, Sodium Selenite, Cobalt Carbonate.

Feeding Directions

- Feed to insectivores at a rate of at least 50% of their daily dry matter intake. Feed intake will vary based on animal body size and life stage, level of activity and environmental temperature.
 1. Initially, soaking the extruded Mazuri® Insectivore Diet (5MK8/5MM3) in water (2 parts water:1 part dry diet) may help to transition animals that are used to soft/moist diets.
 2. After 1-2 weeks on soaked diet, move to 1 part water: 1 part dry diet, and 1-2 weeks later, offer dry diet.
 - If moistened, replace diet twice a day.
- Prepared Mazuri® Insectivore Diet - Meal (5M2A) should be fed out as directed by your veterinarian. Never feed dry powder without first combining with water.
 1. Combine with hot water; adjust mixture to meet desired texture and need.
 2. Mix thoroughly with a spoon, fork or whisk until consistency is uniform, and administer as directed by your veterinarian.
- If feeding live insects to the animal, ensure the insects are gut loaded prior to feeding out.

THIS DIET MAY CONTAIN EXCESSIVE IRON FOR SPECIES THAT ARE SUSCEPTIBLE TO IRON STORAGE DISEASE, LIKE HORNBILLS.





Mazuri® Insectivore Diet

Approximate Nutrient Composition¹

NUTRIENTS

Protein, %	28
Arginine, %	1.74
Cystine, %	0.42
Histidine, %	0.61
Isoleucine, %	1.13
Leucine, %	1.84
Lysine, %	1.68
Methionine, %	0.78
Phenylalanine, %	1.11
Tyrosine, %	0.78
Threonine, %	1.08
Tryptophan, %	0.28
Valine, %	1.26
Taurine, %	0.37

Fat (Acid hydrolysis), %	12
Linoleic acid, %	2.46
Linolenic acid, %	0.17
Arachidonic acid, %	0.08
Omega-3 Fatty Acids, %	0.43
Omega-6 Fatty Acids, %	2.30

Fiber (Crude), %	13
Neutral Detergent Fiber, %	26
Acid Detergent Fiber, %	15
Starch, %	13

Metabolizable Energy ² , kcal/kg	3,080
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MINERALS

Ash, %	7.1
Calcium, %	1.38
Phosphorus, %	0.99
Phosphorus (non-phytate), %	0.82
Potassium, %	0.68
Magnesium, %	0.16
Sodium, %	0.30
Chloride, %	0.42
Sulfur, %	0.35
Iron, ppm	377
Zinc, ppm	115
Manganese, ppm	77
Copper, ppm	24
Iodine, ppm	2.52
Selenium (added), ppm	0.20

VITAMINS

Thiamin, ppm	78
Riboflavin, ppm	24
Niacin, ppm	122
Pantothenic acid, ppm	28
Choline, ppm	2,637
Folic acid, ppm	4.3
Pyridoxine, ppm	14
Biotin, ppm	0.55
Ascorbic acid, ppm	570
Vitamin B ₁₂ , µg/kg	235
Vitamin A, IU/kg	14,659
Vitamin D ₃ (added), IU/kg	3,809
Vitamin E, IU/kg	342
Vitamin K (as menadione), ppm	7.8

Storage Conditions

For best results, tightly affix lid on canister after removal of desired dosage or store contents of open bag in container with sealing lid. Store in a cool (75°F or colder), dry (approximately 50% RH) location. Freezing will not harm the diet and may extend freshness. Use within 1 year of bag manufacturing.

¹ Based on the latest ingredient analysis information. Since nutrient composition of ingredients varies, analyses will vary accordingly.

² Calculated using modified Atwater, factors of 3.5 kcal/g protein, 8.5 kcal/g fat, 3.5 kcal/g carbohydrate (NRC of Dogs & Cats, 2006).

Mazuri® is a registered trademark of Purina Mills, LLC.



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4. Do they use latrines? – they do
5. What diets have been described in zoos? – granulated insectivore diet
6. Can the diet be scattered automatically?



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6. Can the diet be scattered automatically? - yes
7. Concept:
 - granulated insectivore diet as main food
 - scattered up to 16 x per day over sandy areas
 - live insects daily (no need for supplementation), no mealworms but cockroaches or adult crickets
 - 1x/week vertebrate prey (1 mouse/day chick cut into pieces for 5 meerkats)
 - additionally some vegetables (beets, carrots), finely cut, for high-water, lower-energy enrichment



Meerkats

Calculations:

body mass ~ 850 g

maintenance requirement ~ $1.5 \times \text{mammal BMR} \sim 440 \text{ kJ ME /animal /d}$

Insectivore granulated food ~ 22 g / animal / d

Live insects ~ 4 g /animal /d (= 7 crickets or 2 cockroaches)

Vegetables ~ 16 g /animal /d

1 mouse or daychick /5 animals /week not included in calculation

Monitor body condition and adjust as required.

Husbandry:

Drinking water available at all times.

Sift sandy areas regularly to avoid accumulation of organic material.

Red light hotspots at different locations than scatter-feeding areas.

Other enrichment: find ways to foster guarding behavior; use snake skins from reptile house; test (in summer) if dung (e.g. elephants) attracts insects for meerkats



Meerkats

