



WOODLAND PARK ZOO SAVES WILDLIFE  
AND INSPIRES EVERYONE TO MAKE  
CONSERVATION A PRIORITY IN THEIR LIVES.

ZOO.ORG

# Practical Sloth Bear Nutrition

Christine Verador  
Animal Care Manager  
SSP Vice-Coordinator Sloth Bears  
SAFE Sloth Bear Secretary

# Practical Nutrition for Sloth Bears



NOW, YOU  
KNOW!

The sloth bear is a  
myrmecophagous animal  
and it feeds primarily on  
ants and termites.



Sloth Bear  
(*Melursus ursinus*)  
**VULNERABLE**

- Wild Sloth Bear Diets and Implications
- Seasonality of Bears and impacts on feeding strategies
- Diets for bears in human care and their implications.
- Bridging the gap
- Sloth Bear Snacks

# Wild Sloth Bears



## Myrmecophagous Species

Feed on Termites or Ants

### Microbiomes of Termites:

Protists and bacteria in gut to break down cellulose, symbiotic bacteria to help with fermentation.

Methanogenic archaea reduce hydrogen build up in the gut.



*Odontotermes obesus*



# Gut Systems of Bears



## Anatomy

Single chambered stomach

Short digestive tract

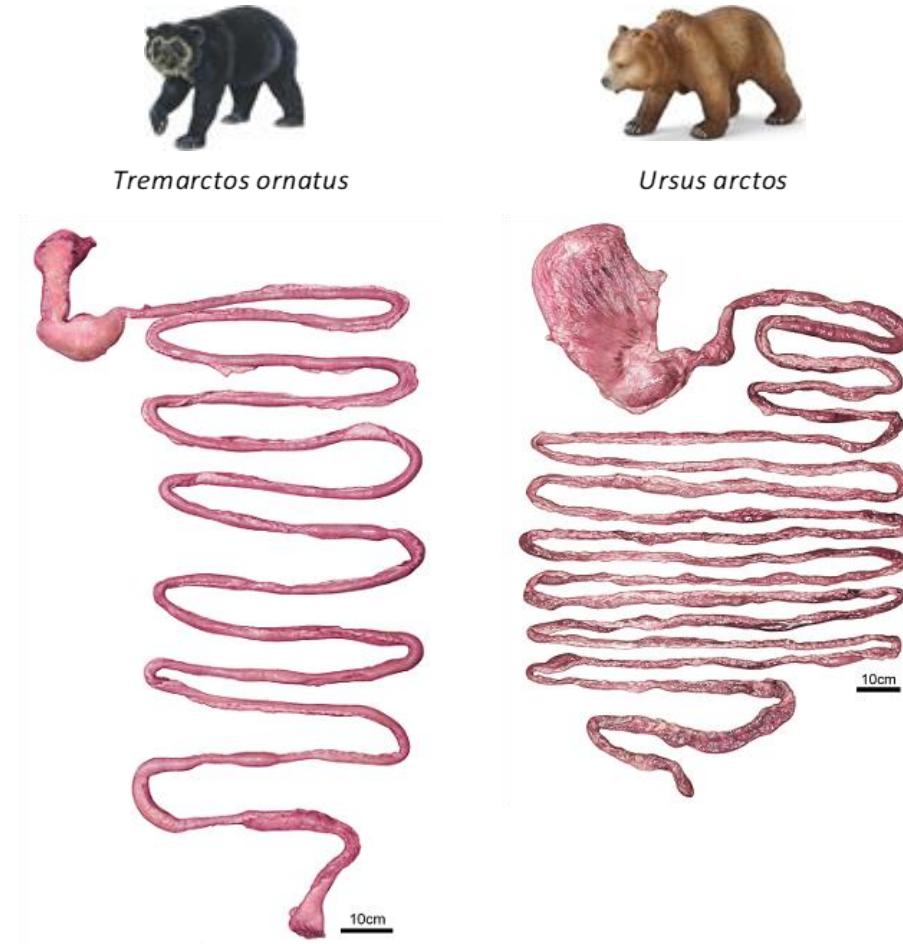
No fermentation process

## Microbiome

Wildlife and Conservation Biology

Research Lab

Comparing wild to captive sloth bear  
microbes.



# Implications for Myrmecophagous Species



## Digestive Challenges

- Hard exoskeletons = Fiber
- Guts with lots of formic acid and lignin derivatives (hard to digest)
- Some elements predigested for the bear. Others are locked inside the microbial biomass.
- Adaptations: Strong stomach acidity or acquire beneficial microbes aiding digestion and immunity.

# Termite Nutritional Values



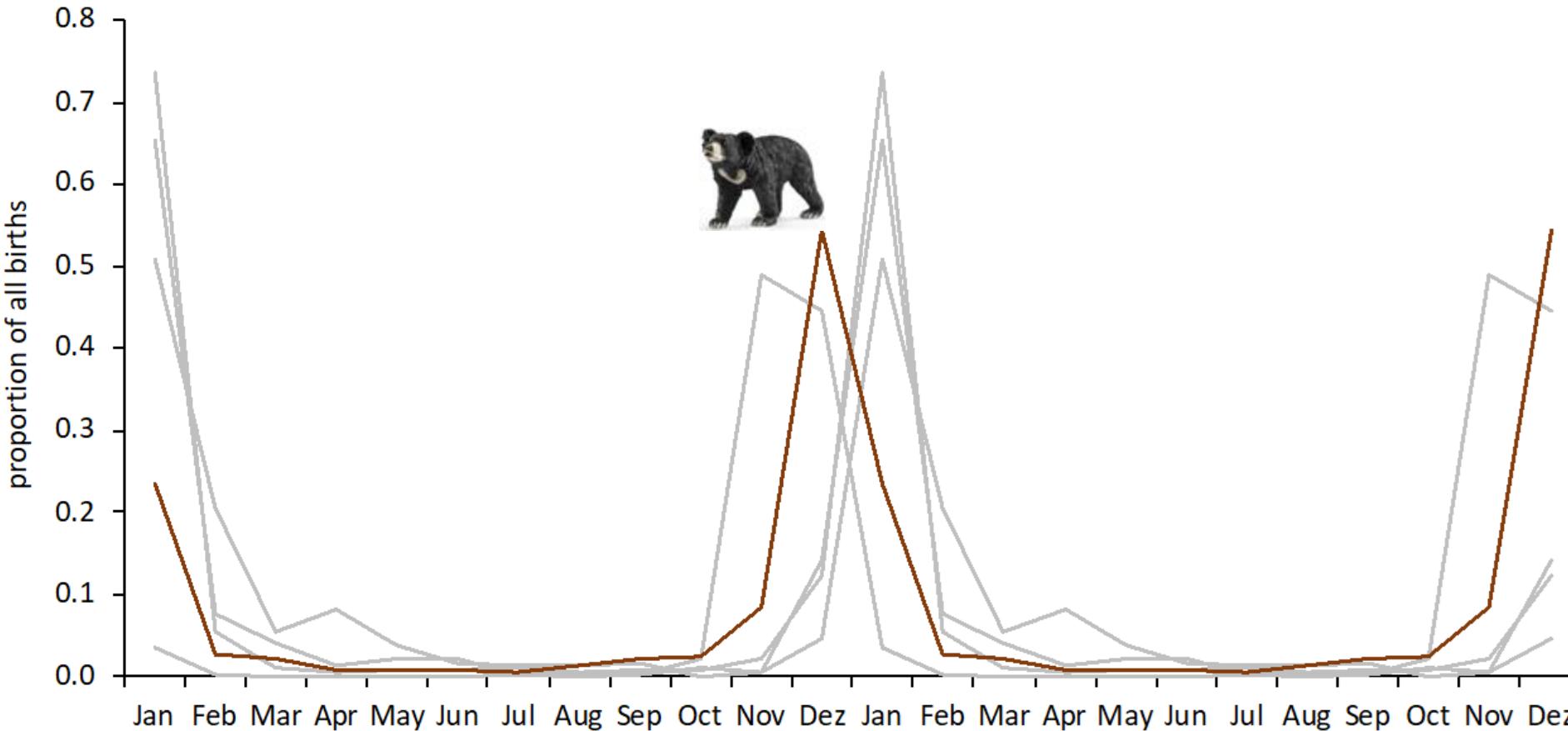
## Wet Weight 100g

Nutrient	Approximate Value	Notes
Water	60–75 g	High moisture content
Protein	10–20 g	Still a good source of complete protein
Fat	5–15 g	High-energy macronutrient
Carbohydrates	~1–3 g	Minimal
Fiber (chitin)	~2–5 g	Mostly indigestible for many species
Ash (Minerals)	~1–3 g	Includes calcium, iron, zinc, etc.
Calories	100–200 kcal	Varies by species and caste (e.g., workers vs. soldiers)

**Rumpold, B. A., & Schlüter, O. K. (2013).**

*Nutritional composition and safety aspects of edible insects.*  
*Molecular Nutrition & Food Research, 57(5), 802–823.*  
<https://doi.org/10.1002/mnfr.201200735>

# Seasonal Bears



# Seasonal Feeding Strategies



**Summer:** March to June = **mostly termites**, insects are active during the dry season

**Monsoon:** July to September = Opportunistic foraging **mix** of fruit, nuts, and insects.

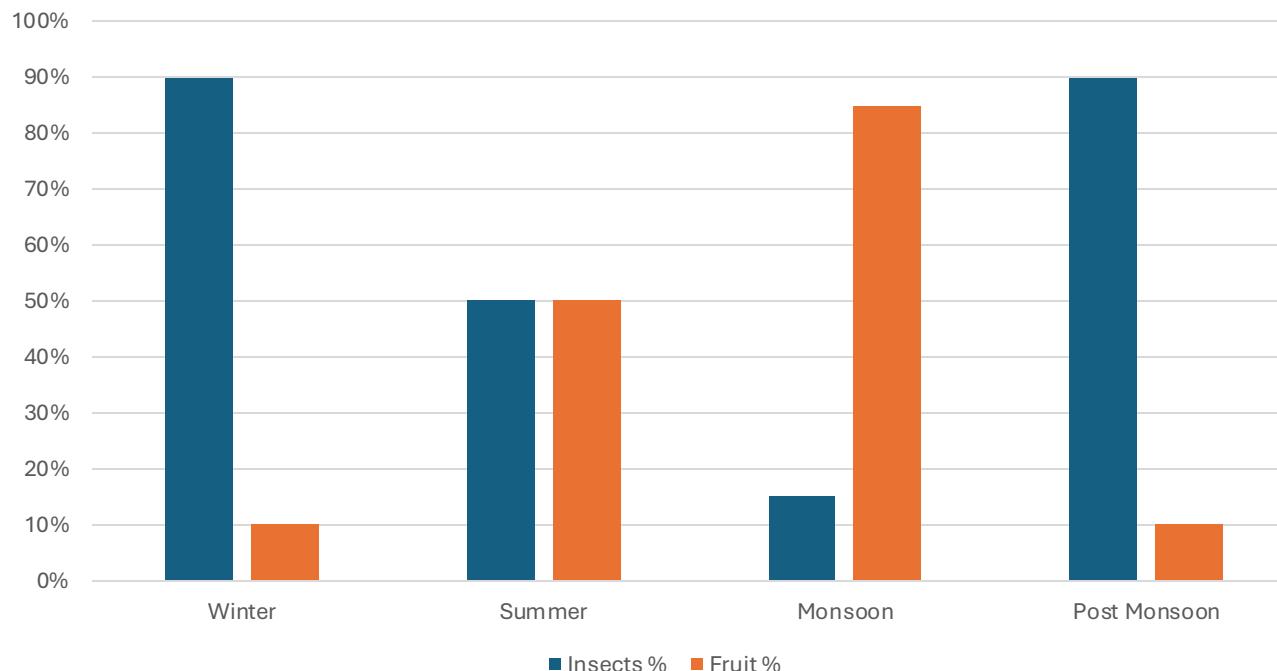
**Post Monsoon/Early Winter:** October to December = **Fruit Peak Time**, wild fruits like *Zizyphus*, *Ficus*, *Aegle marmelos* (bael), and *Cassia* species.]

**Winter:** January to February **Scarce resources**, females in dens for giving birth, Roots, tubers and leftover fruit, insects if available.

# Seasonal Diet Variability

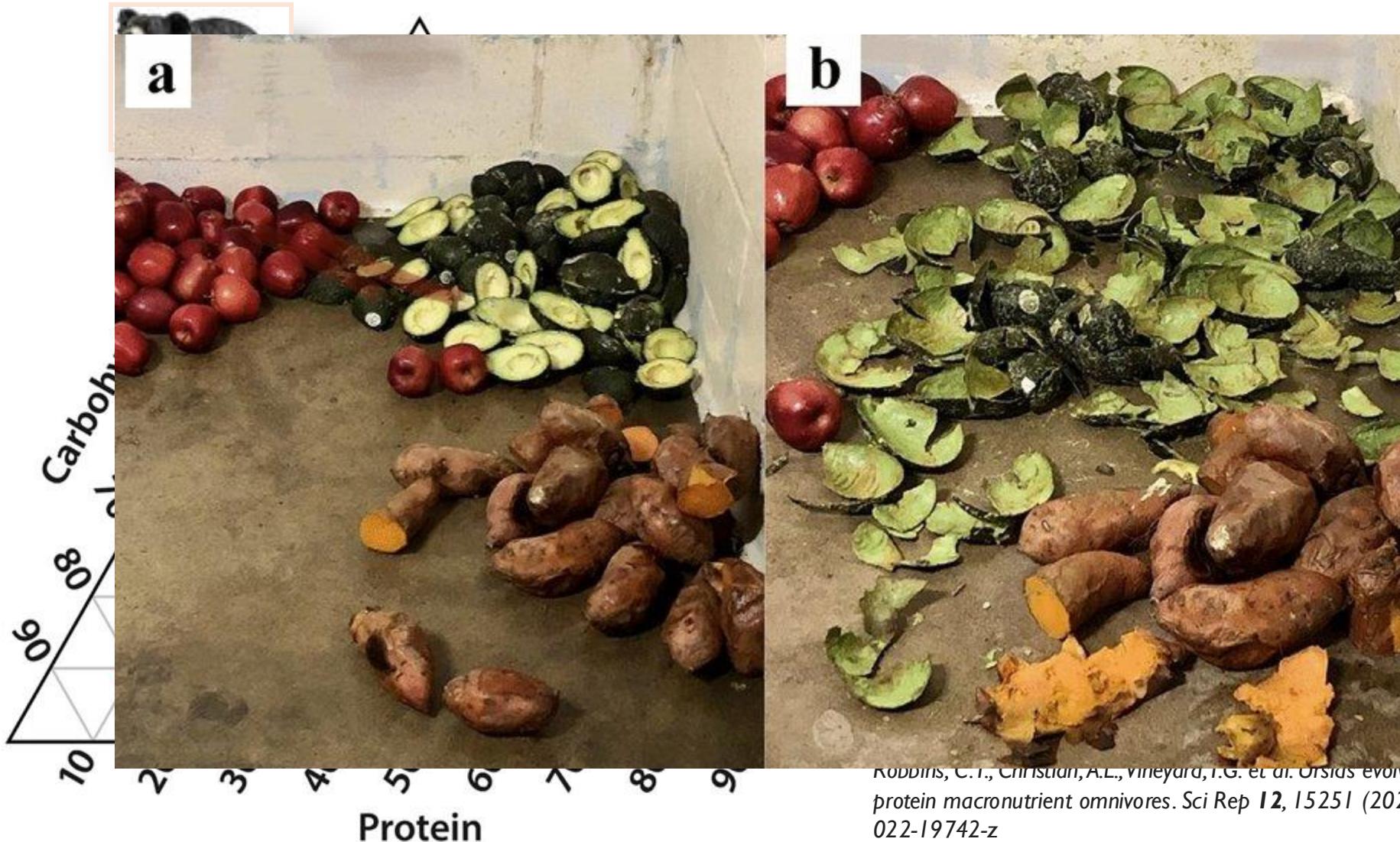


Insect vs Fruit Comparison by Season



Season	Insects (% of diet)	Fruits (% of diet)	Notes
Winter (Dec–Feb)	77–95%	5–23%	Insects, especially termites and ants, dominate the diet.
Summer (Mar–May)	41–57%	43–59%	Increased fruit availability leads to a more balanced diet.
Monsoon (Jun–Sep)	10–20%	70–90%	Abundance of fruits results in a fruit-heavy diet.
Post-Monsoon (Oct–Nov)	80–90%	10–20%	Decline in fruit availability shifts diet back towards insects.

# Nutritional Pyramid



## Sloth bear diets

- American zoos
- European zoos
- Indian rescue centers

RODDINS, C. I., Christian, A.L., vineyard, I.G. et al. Ursids evolved early and continuously to be low-protein macronutrient omnivores. *Sci Rep* **12**, 15251 (2022). <https://doi.org/10.1038/s41598-022-19742-z>

# Sloth Bears in Human Care



WOODLAND  
PARK ZOO

The Association of Zoos and Aquariums (AZA) provides guidelines for the dietary composition of sloth bears in captivity:

- Nutritionally Complete Food:** 30–60% of the diet.



**Mazuri®**  
EXOTIC ANIMAL NUTRITION

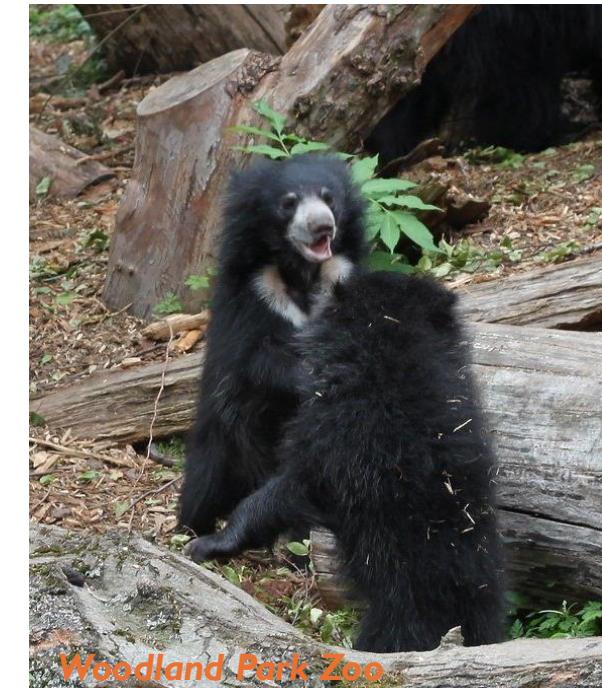
- Produce (Fruits and Vegetables):** 20–40% of the diet.

- Insects:** Approximately 3% of the diet, though this can vary.

- Meat/Bones:** 0–5% of the diet.

- Other/Miscellaneous Items:** 0–5% of the diet, including nuts and seeds.

These proportions aim to replicate the sloth bear's natural intake of low-protein, high-fat foods. ([Nature](#))

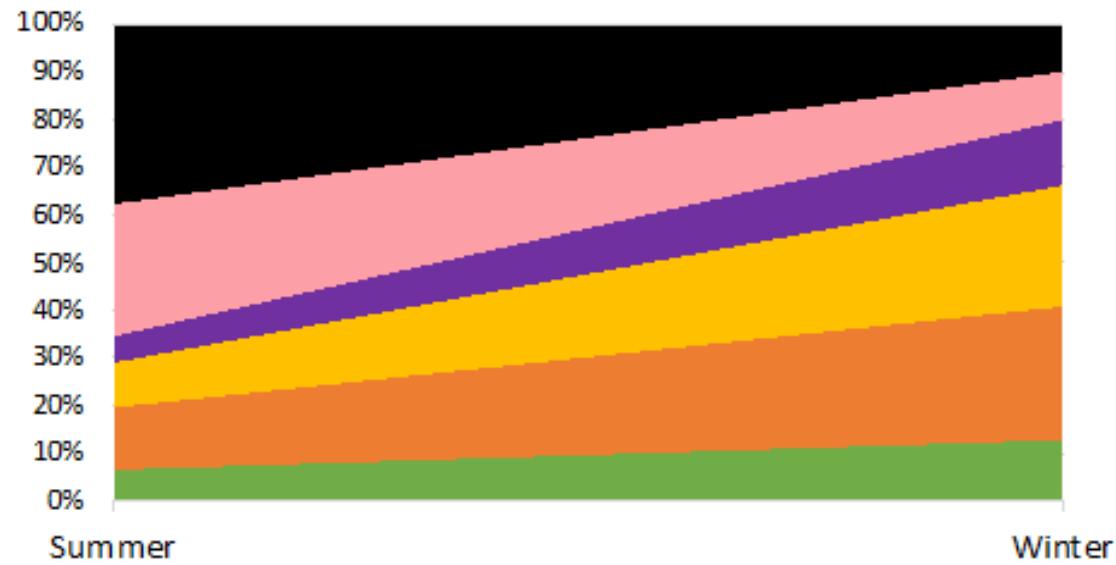


Woodland Park Zoo

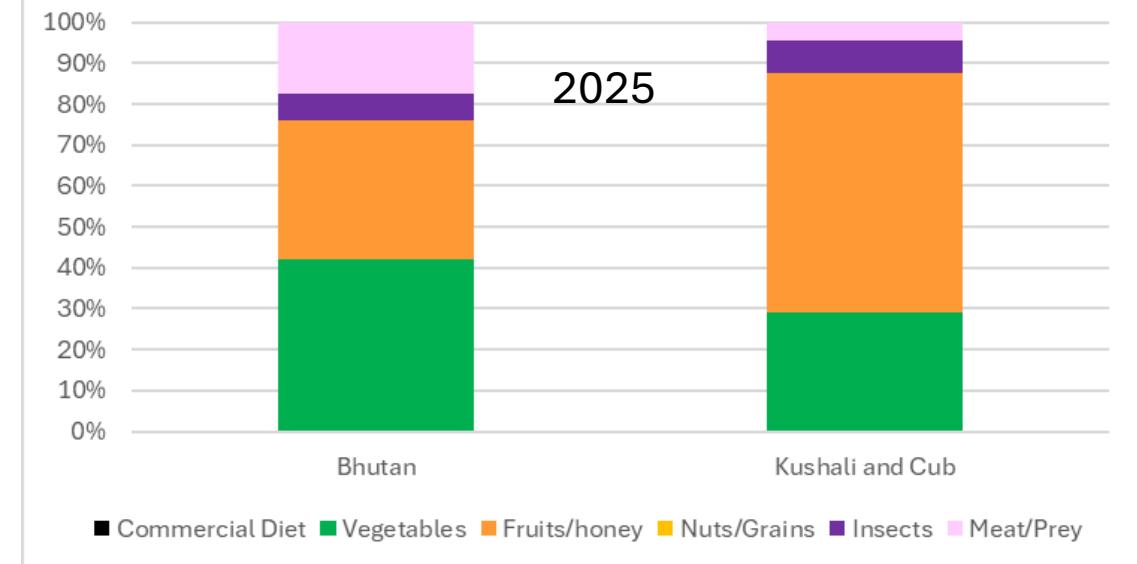
# WPZ Diets



2020



Male/Female Compared Hypophagy Diet

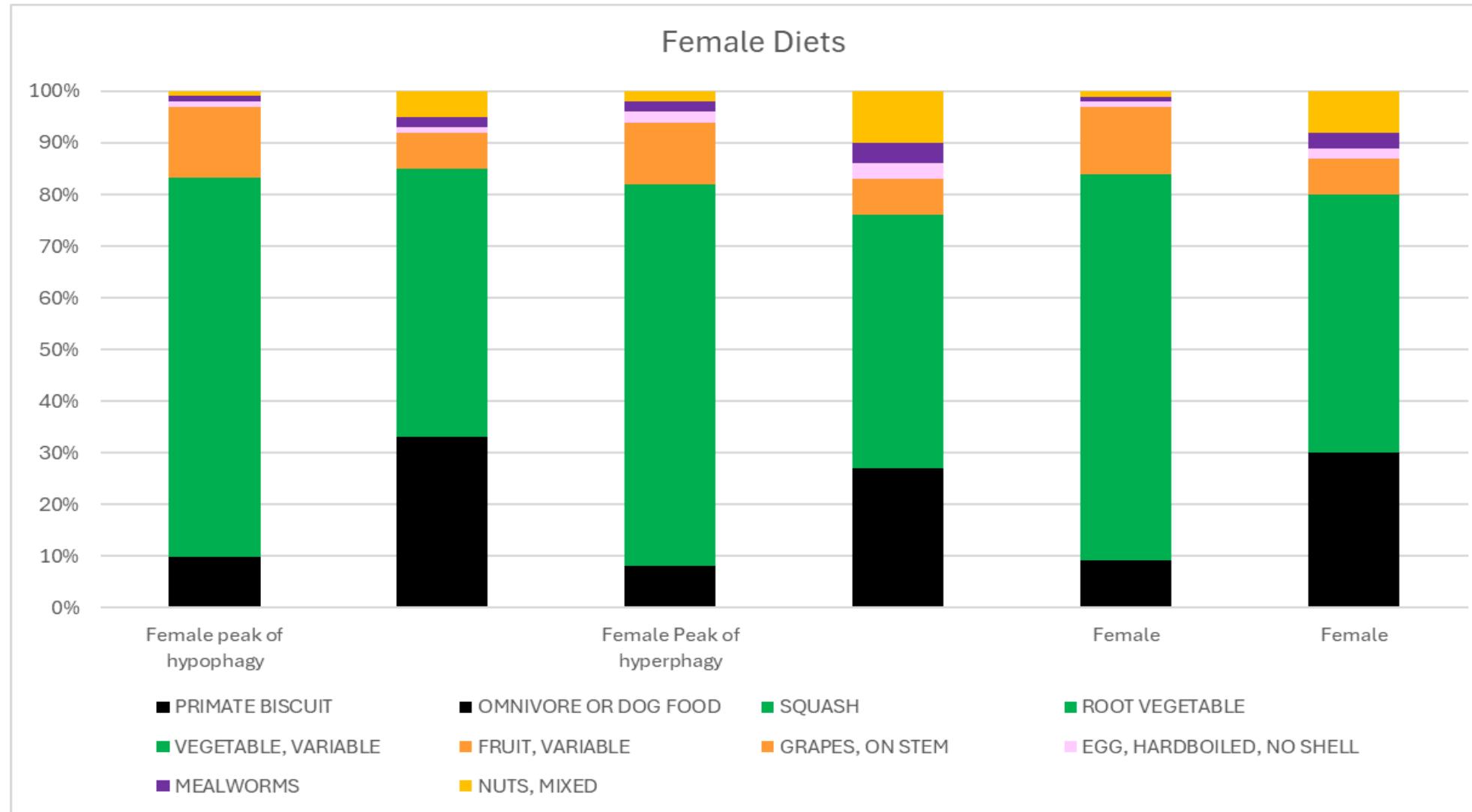


■ Vegetables ■ Fruits, honey etc. ■ Nuts, grains etc. ■ Insects ■ Meat, prey ■ Fish ■ Commercial

# National Zoo Diets



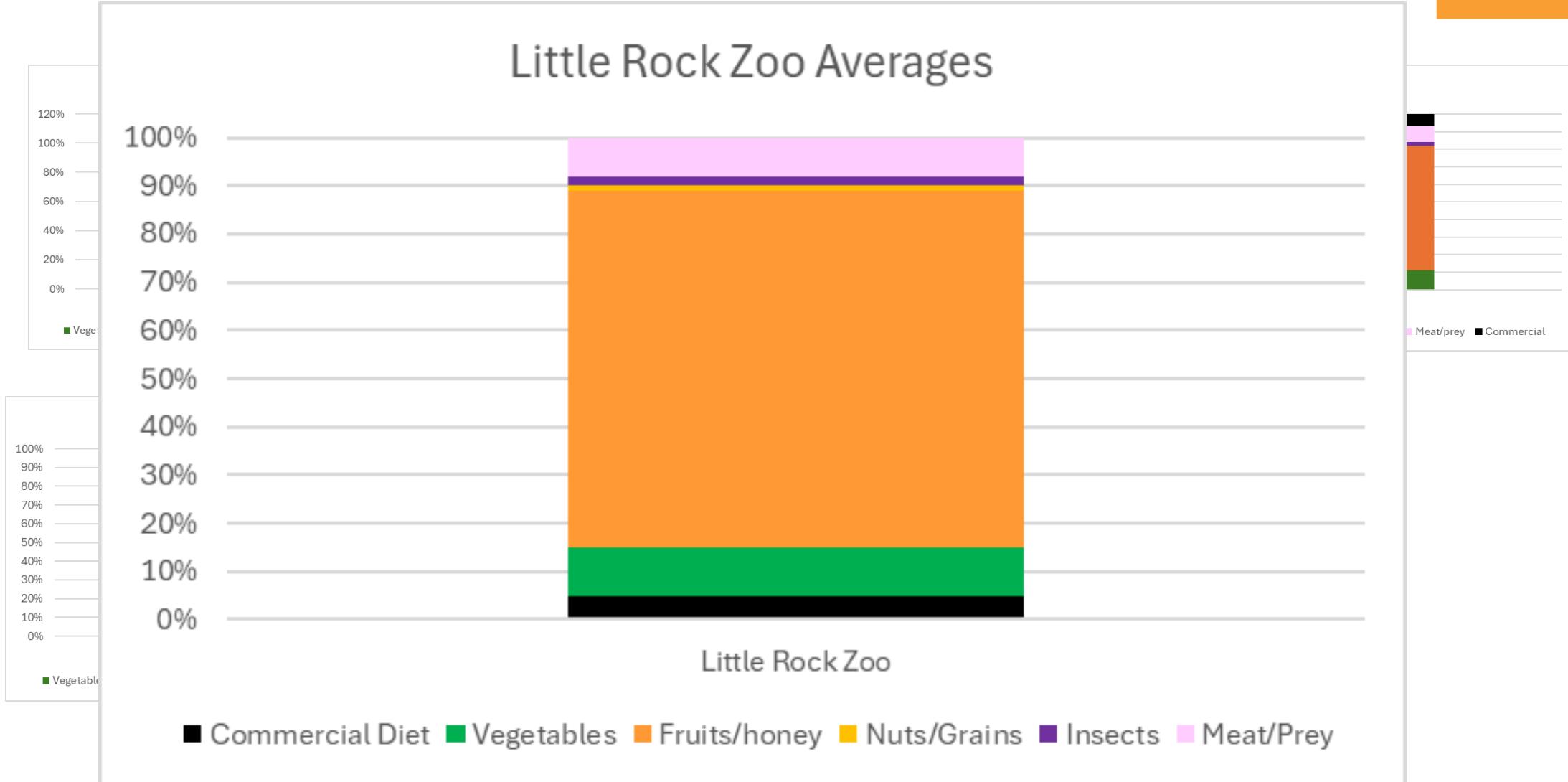
# National Zoo Diets



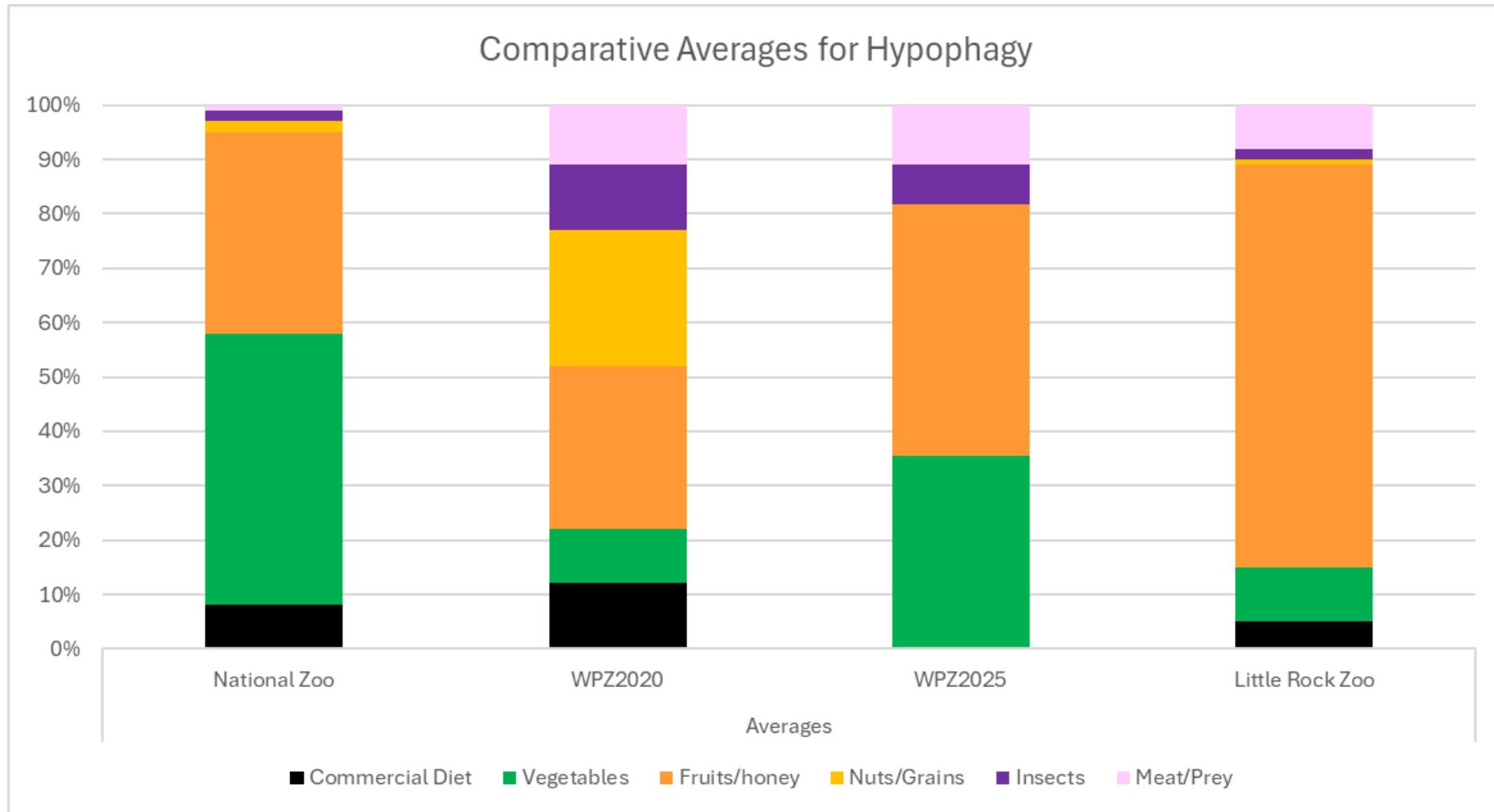
# Little Rock Zoo Diets



## Little Rock Zoo Averages



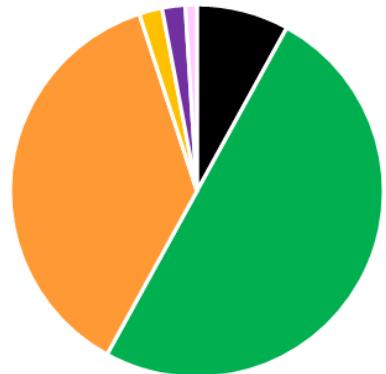
# Comparative Averages



# Comparative Averages



National Zoo



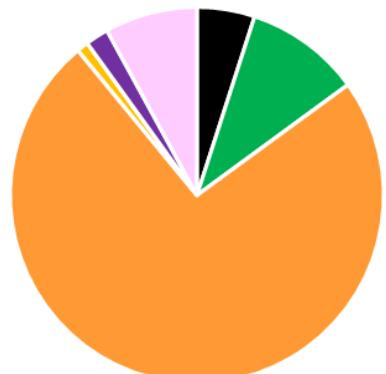
■ Commercial Diet ■ Vegetables ■ Fruits/honey ■ Nuts/Grains ■ Insects ■ Meat/Prey

WPZ2020



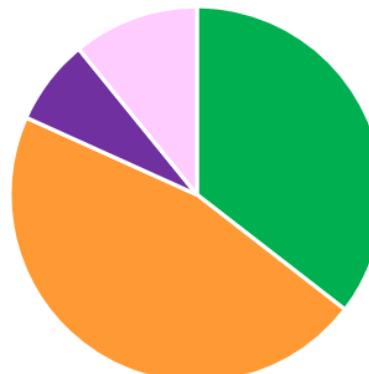
■ Commercial Diet ■ Vegetables ■ Fruits/honey ■ Nuts/Grains ■ Insects ■ Meat/Prey

Little Rock Zoo



■ Commercial Diet ■ Vegetables ■ Fruits/honey ■ Nuts/Grains ■ Insects ■ Meat/Prey

WPZ2025



■ Commercial Diet ■ Vegetables ■ Fruits/honey ■ Nuts/Grains ■ Insects ■ Meat/Prey

# Implications of Zoo Diets



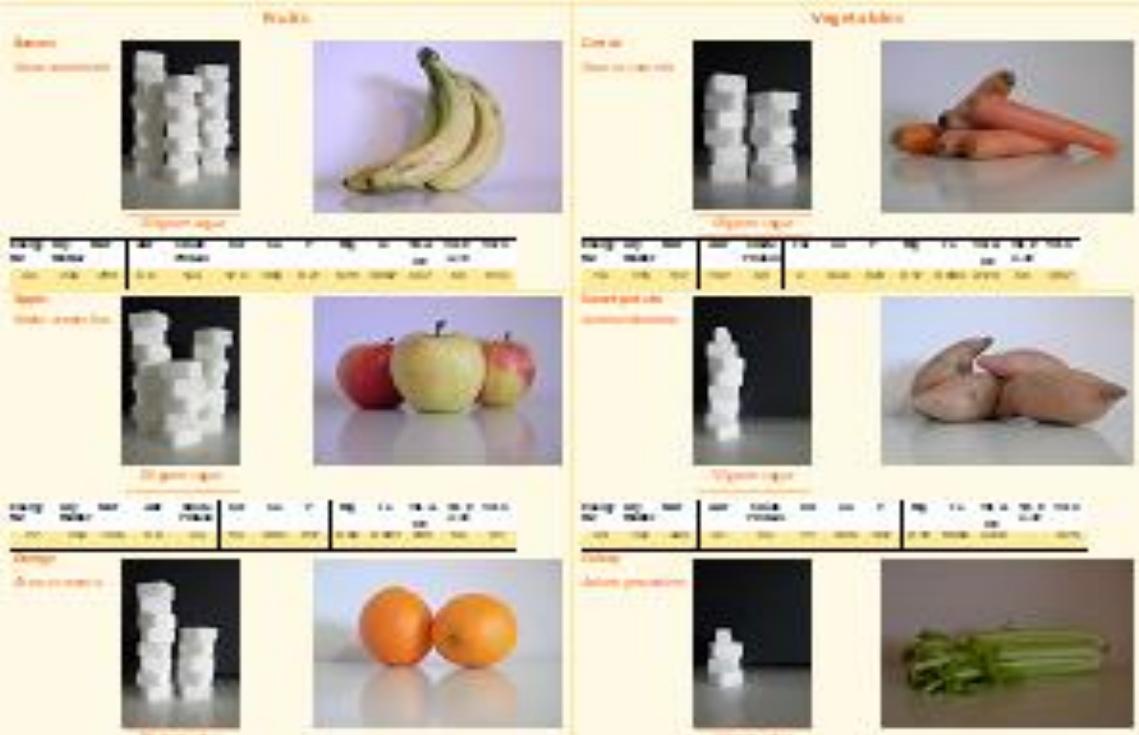
**Research from 1905 to 2015 and published in 2018**

The average **age at death for adult bears was 16.7 yr**, with females surviving a few years longer than males. **Biliary adenocarcinoma** was the leading cause of death for adult bears (58.7-65.2%) with no apparent gender predilection.

# Produce



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



# Rescue Center Diets WSOS



- Seasonal Fruits:** Jackfruits, watermelon, and other locally available fruits.
- Honey:** Used both as a food source and to encourage natural behaviors.
- Porridge:** A mixture that may include grains and milk, providing a soft and digestible food option. ([Wildlife SOS](#))



# Bridging the Gap



## Focus on seasonal variability

Not wild sloth bear seasons, but seasons for the geographic locations of where your zoo is.  
At Woodland Park Zoo we have a long Fall/Spring and a short winter/summer.  
This makes for a highly variable diet based on season and availability of seasonal foods.



The photo by PhotoAuthor is licensed under CC BY-SA.



SUMMER

# Bridging the Gap

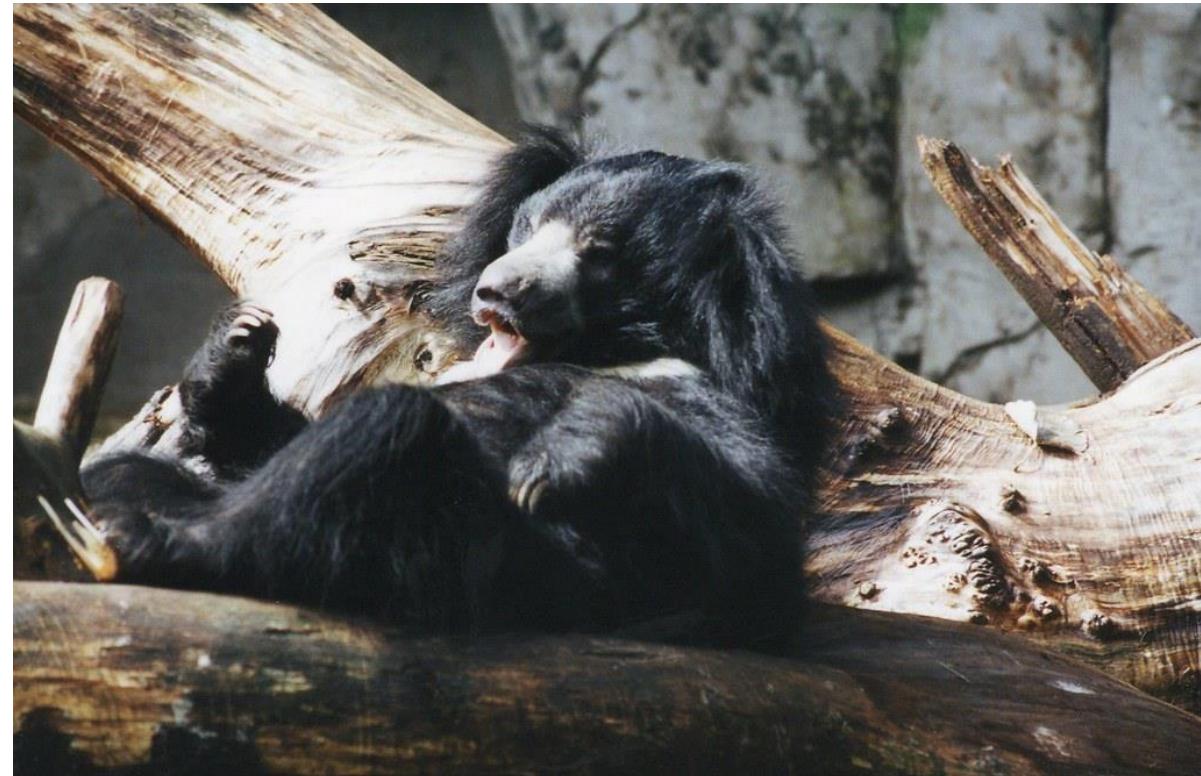


## Variability in types of foods and the amounts fed

**Winter:** may eat less than at other times of year.

**Summer:** Appetites may increase, More bugs!

**Seasonally static:** Diets may be more consistent throughout the year.



# Bridging the Gap



## Allow weights to fluctuate seasonally

There can be a 20% difference throughout the year, but a 10% may be more manageable for **our brains**. Especially in areas with more seasons. At WPZ bears in winter eat a small portion of what they normally eat in the summer. It tapers down in late fall and back up in spring.

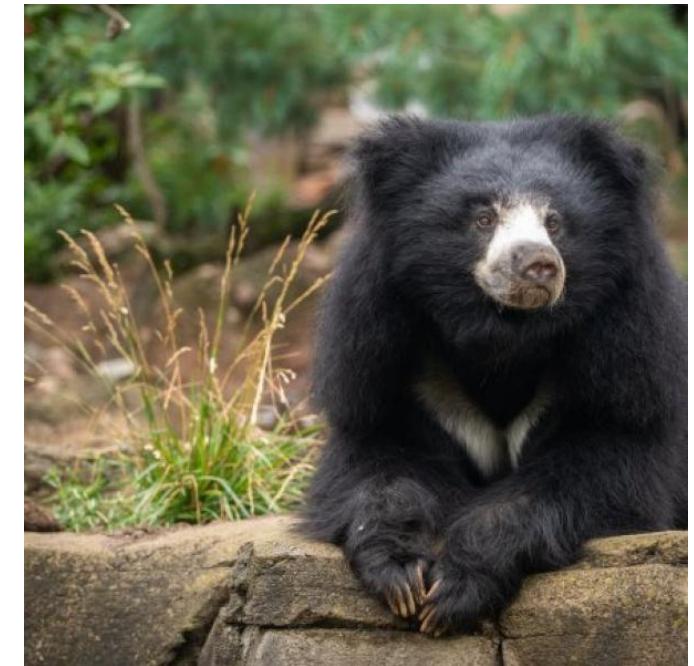
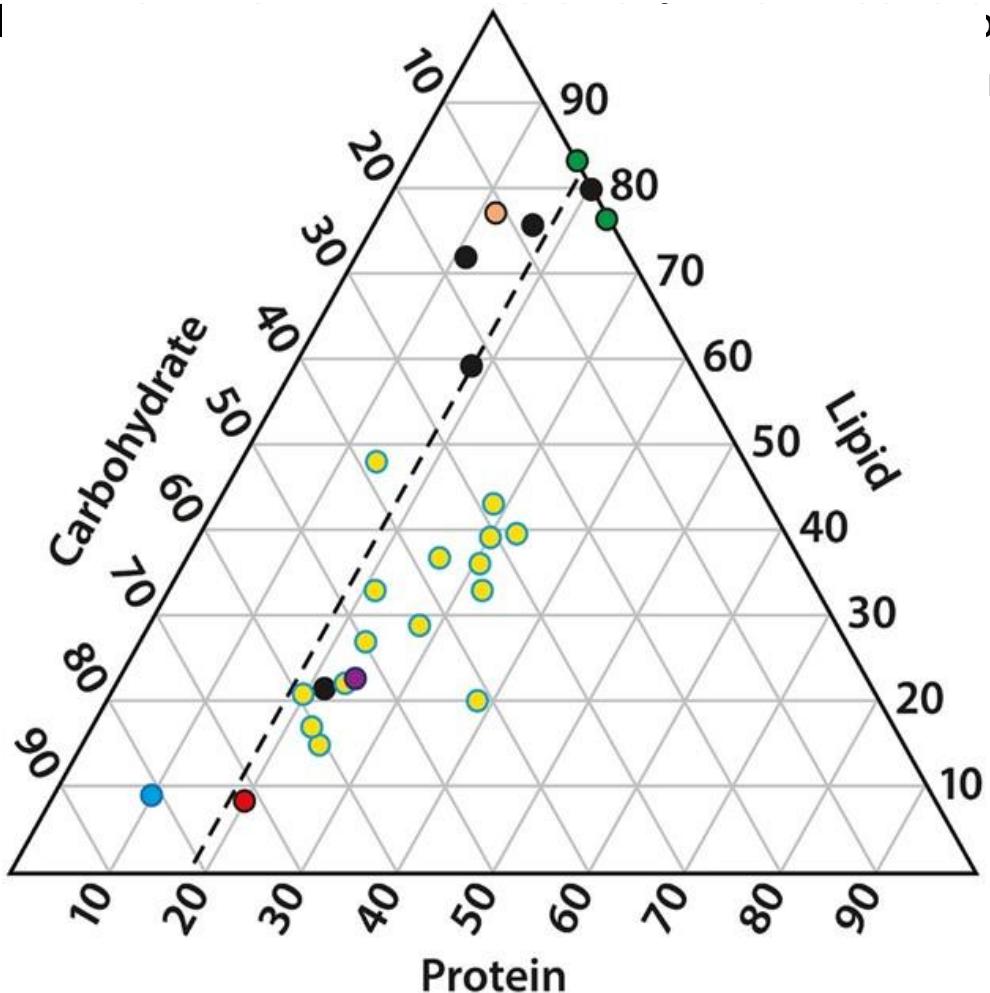


# Bridging the Gap



## Keep an eye on protein

Try to keep protein 1  
and brown bear can



Columbus Zoo

# Bridging the Gap

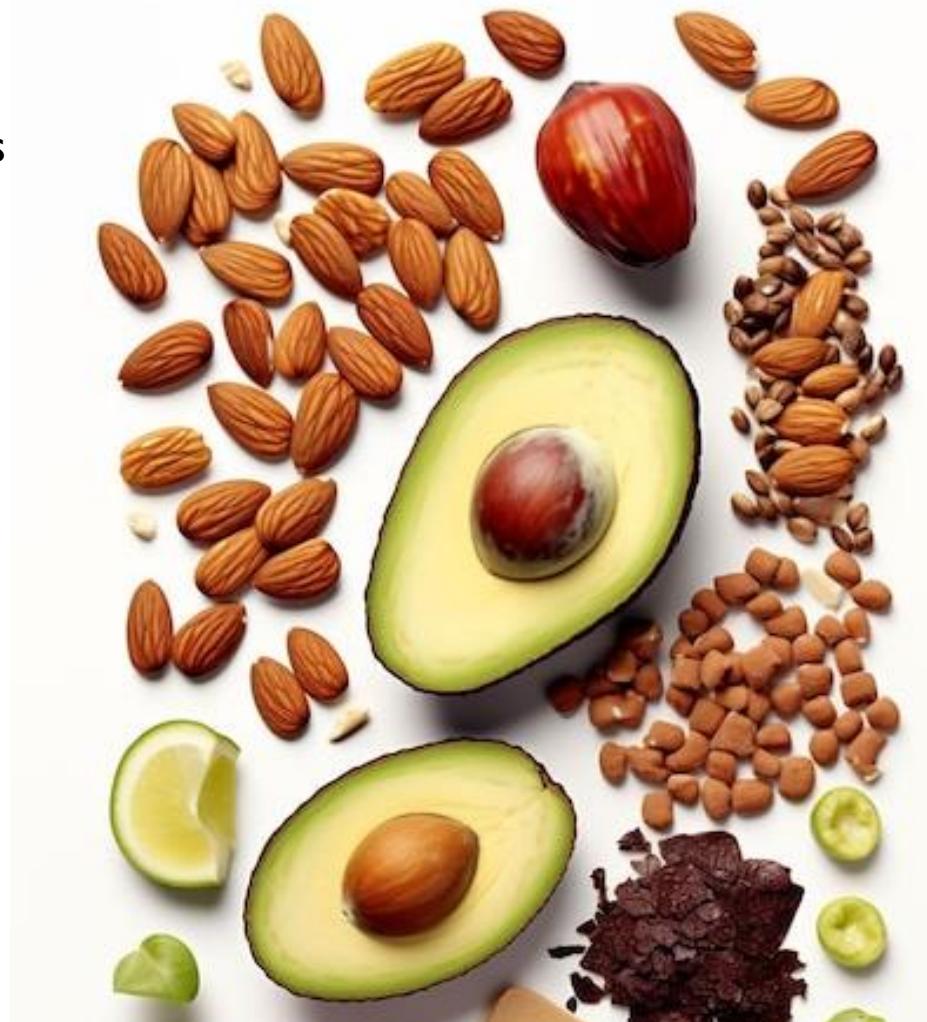


## Focus on fats and Fruits

- Options for fats: Nuts and avocados, some facilities have had good success with bird seed mixes.
- Bugs bugs bugs.
- Breeding own bug colonies



Woodland Park Zoo



# Snacks



## Bear Mash

	Total
Crushed pineapple (with juice)	1 - 20z can
Peanut butter	½ cup
Honey	2 Tb.
Grape Nuts	1 c.
Dry Milk	1 c.
Oats	1 c.

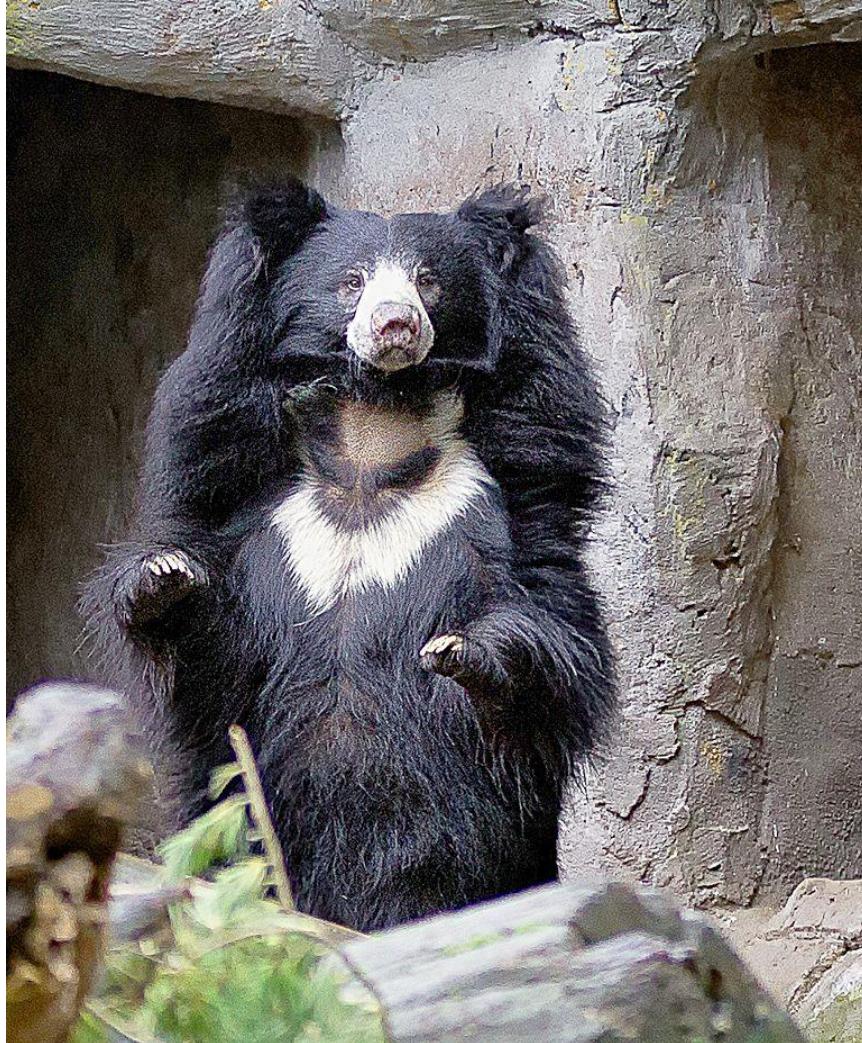
## Raisins/dried fruits

## Agave Nectar/Karo Syrup/HONEY

## Popcorn/Cereals



# Questions



Woodland Park Zoo