

# **NUTRITIONAL SUSTAINABILITY: THE VETERINARY/CLIENT PERSPECTIVE**

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# Nutritional Sustainability of Pet Foods<sup>1,2</sup>

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- **Major approaches**
  - Nutrient composition
  - Ingredient selection
- **Other approaches**
  - Minimizing Food Waste
    - Reduce overfeeding
    - Reduce fecal waste



# Pet owners and nutrition

- **Pets are considered part of the family and many owners want to provide the best for their dog or cat**
- **Many owners are focused on nutrition**
  - **They can relate to making food choices**
  - **This is an aspect of their pet's care they can control**



# What do owners consider important regarding pet foods?

Table 2—Mean ± SD scores\* for pet owners about statements reflecting attitudes toward feed ingredients.

Statement	Feeding practice†		P value‡	Species of pet		P value‡
	Commercial (n = 968)	Noncommercial (n = 74)		Cat (n = 449)	Dog (n = 621)	
The quality of ingredients used for my pet's diet is important to me.	1.44 ± 0.02	1.37 ± 0.08	0.421	1.43 ± 0.03	1.43 ± 0.03	0.992
Dogs (or cats) are carnivores so they need a meat-based diet.	2.38 ± 0.04	1.93 ± 0.13	0.001	2.30 ± 0.05	2.35 ± 0.05	0.470
Whole wheat, corn, and other grains are good sources of nutrition for dogs (or cats).	2.60 ± 0.03	2.77 ± 0.10	0.114	2.65 ± 0.04	2.59 ± 0.04	0.290
Dogs (or cats) need a variety of different foods.	2.64 ± 0.04	1.57 ± 0.14	< 0.001	2.61 ± 0.06	2.50 ± 0.05	0.152

See Table 1 for key.

\*Respondents had the following options for each statement: 1, strongly agree; 2, mildly agree; 3, no opinion or not sure; 4, mildly disagree; and 5, strongly disagree. †Respondents were classified as a commercial feeder when ≥ 75% of their pet's diet was in the form of commercial pet foods or as a noncommercial feeder when ≥ 50% of their pet's diet was from foods other than commercial pet foods, such as home-prepared diets, table scraps, or other foods prepared for human consumption. ‡Values were considered to differ significantly at  $P < 0.05$ .

Michel et al. JAVMA, 2008



# Where do owners get information regarding pet nutrition?

Table 4—Primary sources\* of information about pet care obtained by dog and cat owners.

Source	Pet health care		Pet nutrition		All other pet care	
	Dog	Cat	Dog	Cat	Dog	Cat
Family and friends	118	122	123	102	155	139
Media	59	43	57	41	82	46
Internet	49	40	48	30	59	47
Pet paraprofessional†	40	6	36	9	44	10
Veterinarians	536	356	414	291	372	256
Veterinary clinic staff	41	23	33	20	30	10
Pet store staff	19	10	27	15	32	21
Other	7	11	23	19	13	21
None	13	19	64	53	55	38

\*Primary sources refer to those indicated as the first or second choice among the options provided. †Pet paraprofessionals include breeders, trainers, and groomers.

Laflamme et al. JAVMA, 2008



# Ingredient Selection

- **Ingredient selection has an environmental impact**
- **Owners driving the use of animal proteins in pet foods**
- **Don't realize animals need nutrients and NOT ingredients**
- **In general animal proteins have a much larger footprint than plant proteins**
- **Estimated that 1 kg of animal protein requires 100 times more water than 1 kg of plant protein (Pimentel and Pimentel, 1996)**



# By-products



- **“By-products” are consumed by humans in other countries**
- **Trend toward home butchering and minimizing waste**
- **Organ meats are an excellent source of vitamins and minerals**
- **Domestic cats often eat the heads and entrails first**
- **Some companies are now emphasizing the use of organ meats in ‘whole prey’ or ‘natural’ diets**



# By-products



- Many by-products from human food production are available and used by the pet food industry
  - Brewer's rice
  - Organ meats
- Pet foods that use by-products don't compete with humans for food





# Alternative Protein Sources

- **Other plant proteins**
- **Insects**
- **Single cell organisms**
- **Expired human food products or waste**
  - **26% or 48.1 megatons of edible food**
  - **Fresh fruit (19%)**
  - **Milk (18%)**
  - **In some areas used to feed live stock**
    - **Bakery waste for cattle**





[diytrade.com](http://diytrade.com)



[en.wikipedia.org](http://en.wikipedia.org)



[en.wikipedia.org](http://en.wikipedia.org)



[www.npr.org](http://www.npr.org)



# Macronutrient Levels/ Ingredients

- Protein most expensive in economic and ecological terms
- Characteristics to consider – total amount, nitrogen and amino acid composition, quality, bioavailability and source
- Large disconnect between feline (and canine) protein requirements and the amount in commercial foods



# Protein Levels in Pet Foods

	<b>NRC Minimal Requirement CP</b>	<b>NRC Recommended Allowance CP</b>	<b>AAFCO CP</b>
<b>Dog</b>	<b>8</b>	<b>10</b>	<b>18</b>
<b>Cat</b>	<b>16</b>	<b>20</b>	<b>26</b>

**All data reported on a % dry matter basis (DM)**

**Hill et al. (2009) Reported an average % crude protein (CP) (DM) of 31.4% and 40.8% for 1156 canned and 750 dry canine and feline commercial diets**



# Macronutrient Levels

- Protein content of many pet foods is in excess of requirements
- Cats likely use protein calories more efficiently than other species
  - ↑ protein oxidation → ↑ urinary N and energy loss
- However....
  - Crude Protein does not account for amino acid content
  - Some animals likely require higher protein



# Nutritional Sustainability

- **Major approaches**
  - Nutrient composition
  - Ingredient selection
- **Other approaches**
  - Minimizing Food Waste
    - Reduce overfeeding
    - Reduce fecal waste



**Minimizing Food Waste**



**Reduce Overfeeding**



**Reduced Fecal Waste**



**Reduced Environmental Impact**



**Reduced Obesity**



**Improved Pet Health**



# Obesity

- **Most common nutritional disorder**
- **~24 – 34% of adult dogs**
- **~25 – 40% of cats**





# Obesity



- **Dogs**
  - \* **Musculoskeletal problems**
  - \* **Compromised immune function**
  - \* **Abnormal glucose tolerance**
  - \* **Heat/exercise intolerance**
  - \* **Complications from cardiovascular and other diseases**

# Obesity

- **Cats**
  - \* **Musculoskeletal problems**
  - \* **Diabetes mellitus**
  - \* **Hepatic lipidosis**
  - \* **Early mortality**



**Appropriate Feeding Guidelines**



**Reduce Overconsumption**



**Reduced Fecal Waste**



**Reduced Environmental Impact**



**Reduced Obesity**



**Improved Pet Health**



# Fecal Waste

- **10 million tons (9 million metric tons) of dog and cat waster generated every year**
  - **Woods Ends Laboratory, Mt Vernon ME**
  - **[http://news.nationalgeographic.com/news/2006/03/0321\\_060321\\_dog\\_power\\_2.html](http://news.nationalgeographic.com/news/2006/03/0321_060321_dog_power_2.html)**
- **A study in San Francisco, CA estimated that 3.8% of the garbage in residential collections is canine or feline waste**
  - **[http://news.nationalgeographic.com/news/2006/03/0321\\_060321\\_dog\\_power\\_2.html](http://news.nationalgeographic.com/news/2006/03/0321_060321_dog_power_2.html)**





# DOGGIE DEPOSITS

America's overlooked environmental pollutant

We love our dogs, except when it comes to dealing with the waste they leave behind. This Earth Day, remember to pick up after your pets. Every scoop makes a difference.

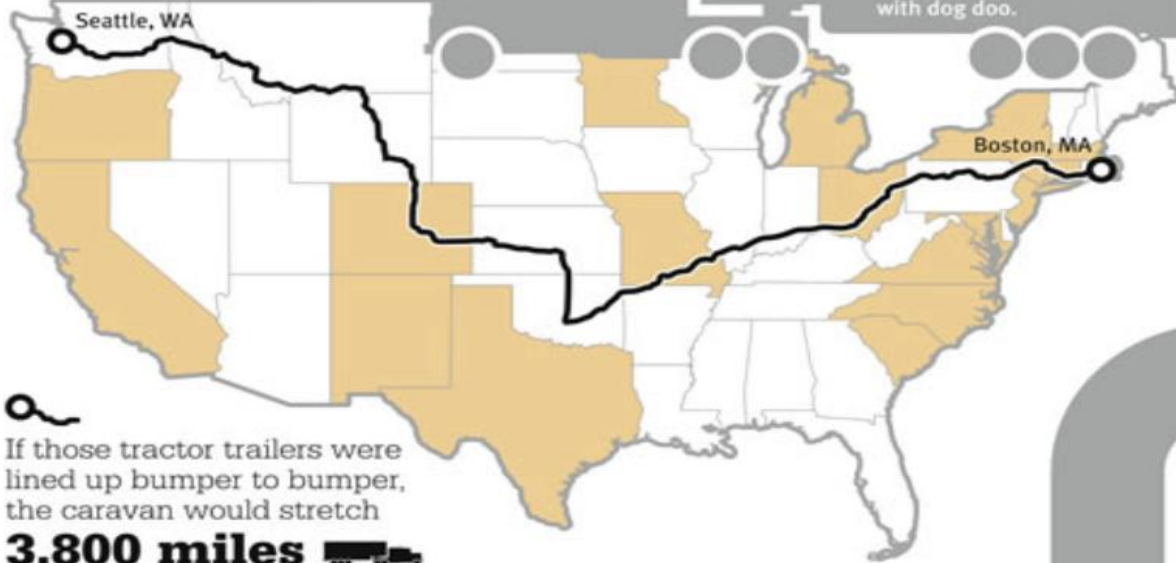
**78.2 million dogs**  
currently live in the United States

Collectively depositing **30,000 tons** of waste every day.

**10 million tons** of waste every year.

That's the equivalent of **267,500** tractor trailers fully loaded with dog doo.

DoodyCalls has locations in these states



[doodycalls.com](http://doodycalls.com)



# Fecal Waste

- **Waste of nutrients into the environment**
  - **Energy**
  - **Nitrogen**
  - **Amino Acids**
  - **Phosphorus**
  - **Vitamins**
  - **Minerals**
- **Unused nutrients enter the ecosystems**
- **Can also shed zoonotic pathogens**



# Fecal Waste

- **Methods to reduce fecal waste**
  - **Maximize nutrient density**
  - **Maximize digestibility**
  - **Maximize bioavailability**
  - **Avoid overfeeding**
- **Use waste as fertilizer or fuel**



# Fecal Waste

- **Nutritional sustainability considerations may negatively impact canine and feline health**
- **Reducing fiber to ↓ DM digestibility**
  - **Fiber promotes digestive health**
  - **Satiety and prevention of weight gain**
  - **Hair ball control**
- **Maximizing caloric and nutrient density**
  - **Overfeeding and weight gain**





# Conclusions

- **Nutritional sustainability is a topic for most large pet food manufacturers**
- **Alternative protein sources are appearing in the market, but much remains to be learned about the nutritional value of some of these ingredients**
  - **Changes in nutrient amounts or sources may result in alterations in digestibility, bioavailability and processing; impacting urine and stool volume, quality and odor**



# Conclusions

- **Feeding guidelines and equations for determining energy requirements are being reconsidered (food companies, AAFCO, NRC)**
  - **Changes in the amount fed → ↓ obesity and healthier dogs and cats → changes in activity levels and litter box behaviors (?)**
  - **Changes in the amount fed → changes in digestibility, urine and fecal volume and odor**



# Conclusions

- **Client Education**
  - **Nutritional value of pet food ingredients**
  - **Many owners do not recognize that their pets are overweight or obese**
    - **Eastland-Jones et al., JAPAN, 2013; Bland et al., Prev Vet Med, 2009 & 2010; White et al. JSAP, 2011**
  - **Reinforce importance of accurately measuring out food**
    - **Weighing is the most accurate method**
    - **Measuring by volume can be problematic**
    - **German et al., JAPAN, 2011; Heuberger & Wakshlag, JAPAN, 2011; Murphy et al. JAPAN, 2012**

