

THERMAL
select®

Seasons Natural®

CLIMATE-SPECIFIC PET FOODS

*Blending science, nature and nutrition
for the changing seasons:*

The most scientifically advanced pet food in the world



The science behind Seasons Natural® climate-specific pet foods is based upon the proven, published SCIENTIFIC FINDINGS of numerous physiologists. These findings show a very real physiological link between environmental temperature and the nutritional needs of companion animals.

This link has been consistently overlooked by pet food manufacturers. Until now.



Seasons change - So should your pet's food.™

US Patent # 7,120,588 B2. Australian Patent # 2004304885. Global patents pending.

1A. Seasonal Effects on the Metabolic and Nutritional Requirements of Dogs

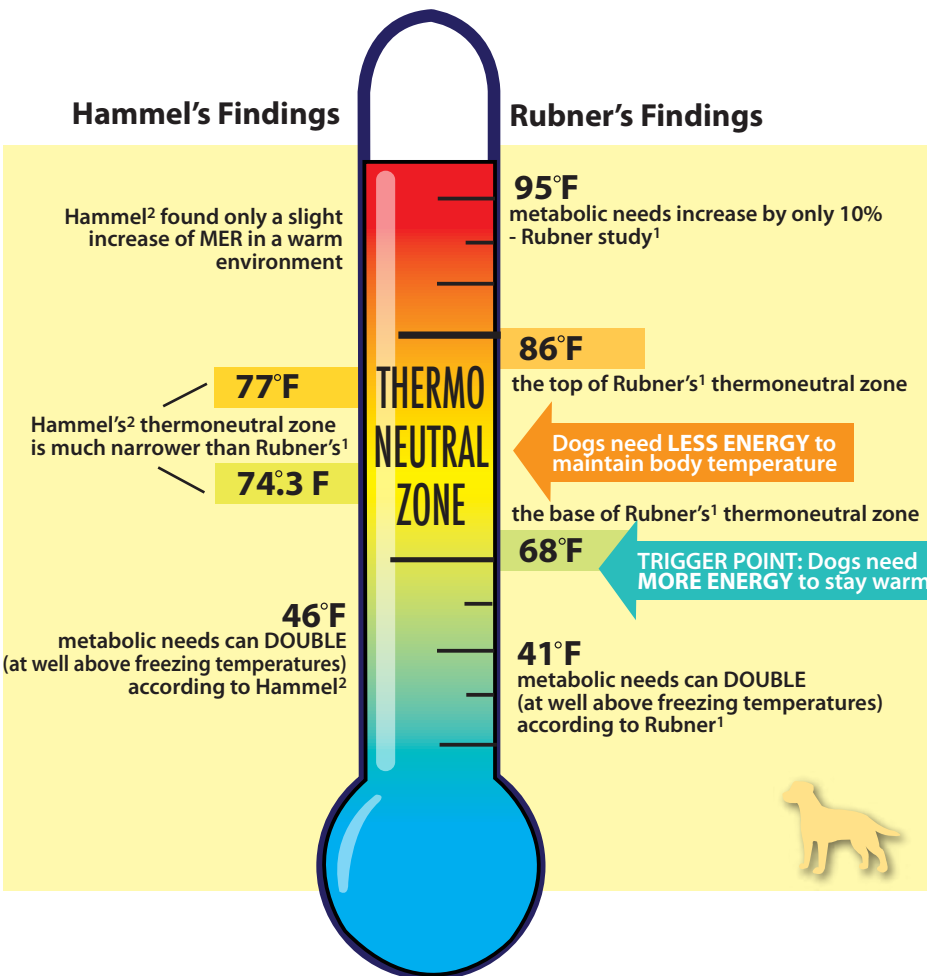
- Melissa Brookshire, DVM

The effects of environmental temperature changes on the metabolic energy requirement (MER) of dogs have been overlooked by pet food manufacturers since the invention of processed pet food.

Seasonal impact on hair coat is well recognized by pet owners when they have to sweep piles of hair left behind by shedding pets. Seasonal shedding is the body's response to changing light patterns (Circadian Rhythm – See section 3 below) as well as changing temperatures. In the fall, the thinner summer coat is shed to make room for the denser winter coat. The opposite occurs when the seasons change back from winter to spring. Pets that live indoors will go through this same cycle of shedding and growing new coats, but the winter coat will not be nearly as dense in a house pet compared to an outdoor pet. So, when the pet that lives indoors is exposed to temperatures as mild as 68°F, they will burn more energy to maintain their normal body temperature of 101°F because their coat is not nearly as effective at insulating.

These effects have been investigated and published as long ago as the late 1800's by German scientist Max Rubner.¹ It is well accepted that dogs have variable nutritional requirements according to their level of work and even according to their size and breed. However, it has long been overlooked that dogs have variable nutritional requirements according to seasonal variations in environmental temperatures.

Rubner's study is still accepted today as fact and referred to by many scientific publications that explore the topic of environmental temperature changes and their impact on the dog. Rubner concluded that dogs that are metabolically neutral between 68°F and 86°F will double their metabolic rate (MER) when exposed to environmental temperatures of 41°F. Conversely, at extremely high temperatures of 95°F, the metabolic rate increases only moderately, by 10% above baseline.



In 1958, Dr. Harold Ted Hammel studied the heat production and heat loss in a group of 3 dogs at environmental temperatures of 46°F and 97°F. In this study, it was determined that the dogs had critical temperatures in a narrow range between 73.4°F-77°F - This means that above or below these two environmental temperatures, these dogs utilized additional energy to maintain their body temperature. However, the change in resting rate of heat production in the dogs in the hot environment was barely increased from that over the dogs in a thermoneutral environment, while the dogs in the cold environment nearly doubled their heat production and therefore metabolic rate.²

Conclusion: At 68°F & above, pets need less energy to maintain body temperature. Below 68°F, they need significantly more energy to maintain body temperature.

Fig. 1a-1. Metabolic Energy Requirements (MER) by temperature

Seasonal Effects on the Metabolic and Nutritional Requirements of Dogs, *cont'd*

It is interesting that Rubner determined that the thermoneutral temperature is between 68°F and 86°F, while other scientists suggest a much narrower range. Dogs would exist in Hammel's range of 73.4°F-77°F for a very limited amount of time. Based on his conclusion that dogs kept outside this temperature range, especially those housed at lower temperatures, utilize additional energy to maintain body temperature, we can conclude that nearly all household pets in most locales use extra energy for thermoregulation for much of their lives.

In Minaire's 1981 study, the metabolic rate for cold exposed dogs was **4.3 times the rate for dogs at normothermic temperatures**.⁵ This value was determined by moving the dogs from a temperature of 77°F to a temperature of -6°F. Mussa and Prola's summary article emphasizes the importance of the challenges in determining the appropriate energy intake of the dog. The key factors affecting energy requirements mentioned in their article are: lifestyle, breed, environmental temperature and digestive work. Environmental temperature has a significant impact on energy requirements, with an increase in energy requirement of 25% for dogs at a temperature of 32°F.⁶

While much of the existing data on this topic is from laboratory studies or studies done under extreme environmental conditions, the data can easily be extrapolated and applied to our pets. With a narrow thermoneutral range, many pets spend the majority of their day (even indoors) at a temperature above or below thermoneutral. Many dogs spend time outdoors no matter what the environmental conditions (see figures 1 and 2). Adjusting the nutritional intake of these dogs is critical to maintaining an ideal lean body condition. When dogs have increased energy requirements, they must be fed a greater number of calories per day to maintain their body weight and condition. Increased feeding amounts can lead to digestive upset, especially if the increase is significant. Feeding a diet that is more energy dense (higher levels of fat and calories) during these times of increased demand will help provide appropriate energy without overwhelming the digestive system.

Dogs that live in extreme conditions, such as Inuit sled dogs in the Arctic, have a much wider thermoneutral zone than do the dogs studied by Rubner and Hammel. A recent study of Inuit sled dogs determined that their daily resting energy requirement (DER) in the winter was 1.7 times that of their summer DER.³ Work increased their energy requirement even more significantly. Dogs that work in the cold temperatures and especially those that work in cold, wet conditions will have significantly higher energy requirements than a resting dog at the same environmental temperature. Männer's study details the difference in the critical temperature for 4 different breeds of dogs, which supports the conclusion that different dogs will utilize energy for thermoregulation at different temperatures.⁴

References

1. Rubner M. Ueber die Einfluss der Körpergröße auf Stoff und Kraftwechsel. Z Biol 1883; 19: 535-562.
2. Hammel HT, Wyndham CH, Hardy JD. Heat Production and Heat Loss in the Dog at 8-36°C Environmental Temperature. Am J Physiol 194: 99-108, 1958.
3. Gerth N, Redman P, Speakman J, Jackson S, Starck JM. Energy metabolism of Inuit sled dogs. J Comp Physiol B: Biochemical, Systemic and Environmental Physiology. 2009, Vol 180 (4): 577-589.
4. Männer K. Energy Requirement for Maintenance of Adult Dogs. J Nutr 121: S37-S38. 1991.
5. Minaire Y, Forichon J, Dallevet G, Jomain MJ. Combined Effects of Cold and Somatostatin on Glucose Kinetics in Dogs. Eur J Appl Physiol (1981) 46: 249-259.
6. Mussa PP, Prola L. Dog Nutrient Requirements: New Knowledge. Vet Res Comm 29(Suppl 2) (2005) 35-38.

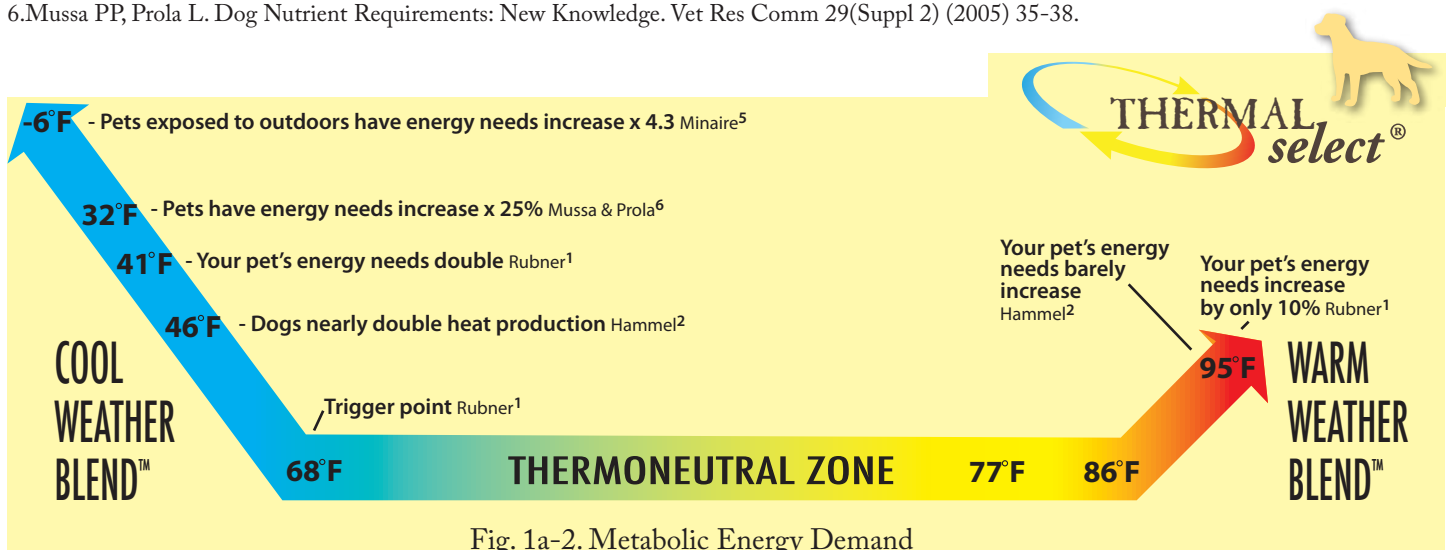


Fig. 1a-2. Metabolic Energy Demand

1b. Seasonal Ambient Temperature Fluctuation in North America and around the world

The seasons are a timed order of natural events which correspond to our calendar year: Spring is the Vernal Equinox on March 23; the Summer Solstice on June 21; the Autumnal Equinox on September 23; and Winter solstice January 21. This applies everywhere in the world, except that the seasons in the northern hemisphere will be the opposite in the southern hemisphere. Essentially, winter here in North America is summertime in Brazil and Australia, due to the 23.5° tilt of our earth.

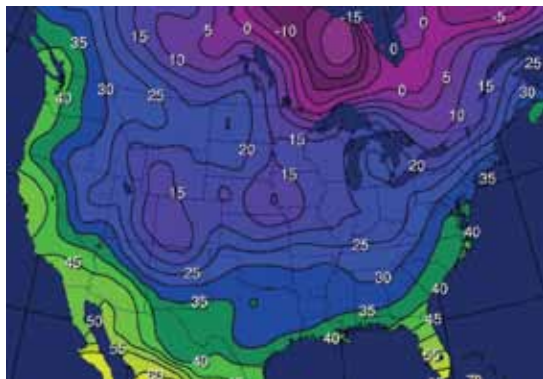


Figure 1b-1 Surface temperature map of the US in January

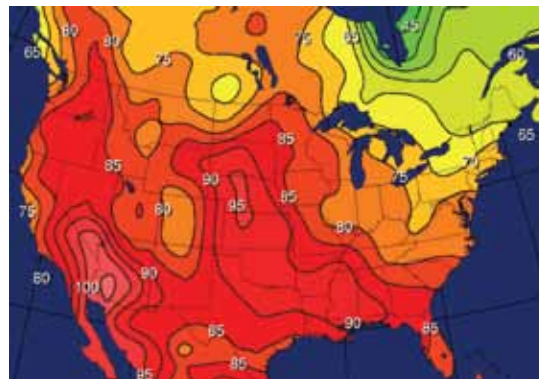


Figure 1b-2 Surface temperature map of the US in July

Ambient temperatures across North America range from -40°F lows in parts of Canada to over 115°F in parts of the USA – *a total variance of over 155°F*. Cool weather temperatures of 35°F and lower are felt over 95% of North America, and warm weather temperatures of 85°F and higher are felt over 90% of North America. These temperature spreads affect billions of humans, and tens of millions of dogs and cats. Virtually all living creatures on earth are affected, some more so than others depending upon their relative position on earth.

Seasons are caused by the tilt of the Earth as it rotates around the sun

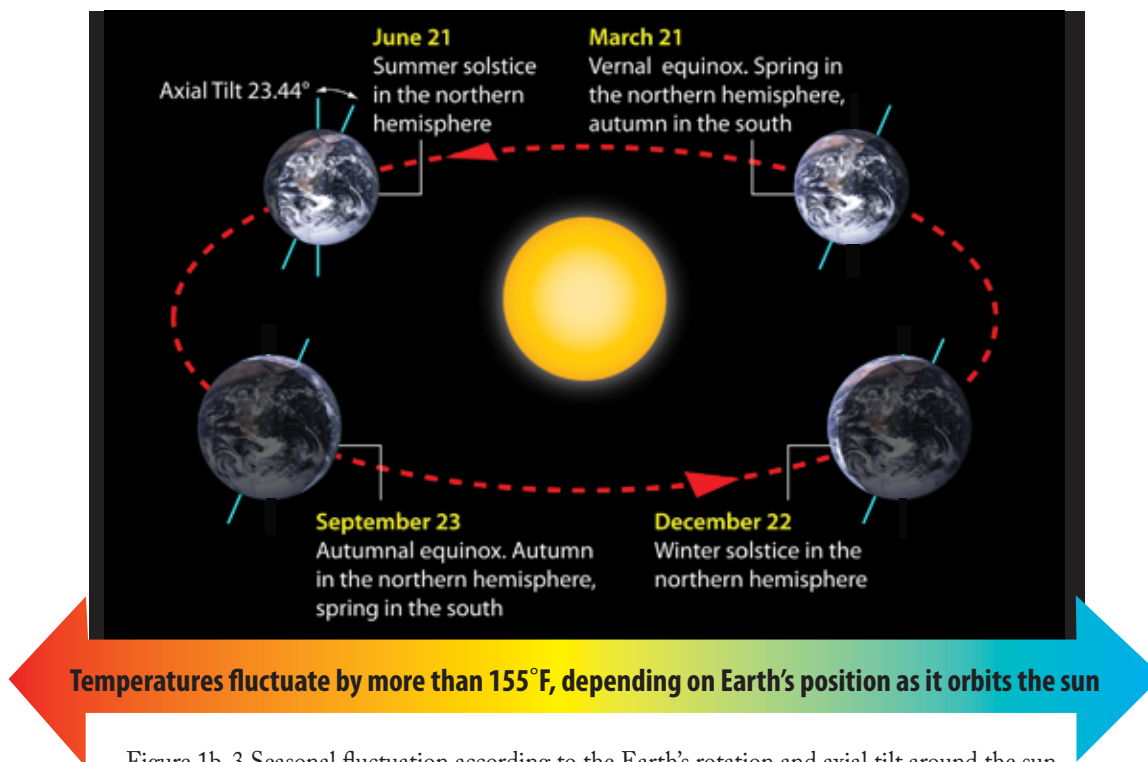


Figure 1b-3 Seasonal fluctuation according to the Earth's rotation and axial tilt around the sun

2 - Physiological implications

Effect of ambient temperature on domestic pets

The question remains - how are domesticated animals housed indoors with managed temperature range affected by climate? - More so than most people know. A domestic dog or cat's internal temperature is 101°F average. A "Thermal Neutral Zone" exists (see Fig 1A-1), as determined by numerous scientific studies cited in NRC's 2006 publication of *Nutrient Requirements of Dogs and Cats* is 68°F - 87°F. Figure 11-1 and numerous studies cited above in section 1A.

These published studies indicate that there is a baseline MER that dogs use to maintain normal body temperature between ambient temperatures of 68°F - 87°F. It is important to understand how warm the trigger point of 68°F, at which a companion animal starts to stoke the internal fires to maintain normal body temperature, truly is. As a human comparison: Try jumping into a 68°F swimming pool. This will cause your body to instantly start burning more energy to defend against hypothermia. In fact, a human body can go into hypothermic shock when core body temperature drops to 95°F; our pets will also go into thermal shock at 89°F core body temperature.

The demand point upon a domestic pet to induce an increase in energy production to maintain core body temperature starts at 68°F (Rubner)/73.4°F (Hammel). The demand increases many times as the temperature drops. In warmer climates, dogs and cats decrease activity level to keep cool and less protein and fat is required to maintain MER until a modest increase of +/- 10% kicks in above 86°F due to energy expended in panting to cool the body.

Indoor Dogs & Cats

Indoor pets are less prepared for temperature fluctuations than dogs and cats that spend significant amounts of time outdoors. The reason for this is that indoor pets do not grow the same dense coat to protect them against temperature fluctuations. Any exposure to temperatures below 68°F will induce these pets to increase the amount of energy they are expending to maintain core body temperature. While pets living indoors are also more sedentary with reduced metabolic energy requirements and less responsive internal metabolic regulation, compared to pets exposed to both outdoor and indoor living and exercise, indoor pets are more susceptible to cool ambient temperatures below 68°F. In warm climates, even less protein & fat is required for indoor sedentary pets.

Hammel's studies validate a range of 73.4°F-77°F wherein any pet exposed to temperature below this range will require more energy to maintain thermal genesis. This is a much warmer temperature than many household interiors maintain during winter, especially at floor level because cold air drops and warm air rises.



Dogs need less energy in summer

As a human comparison: Try jumping into a 68°F swimming pool. This will cause your body to instantly burn more energy to defend against hypothermia. In fact, a human body can go into hypothermic shock when core body temperature drops to 95°F; our pets will also go into thermal shock at 89°F core body temperature.



Even indoor pets need more energy in cool weather

3 - Circadian Rhythm

Your pet is programmed by nature to shed

Over millennia, animals (including companion animals) have physiologically evolved to survive the extreme changes of the seasons. The skin, which is the largest organ on all animals, contains hair follicles that produce the coat which protects them. They shed their coat in spring and fall – because this is a SAFE temperature zone to do so – to prepare for the upcoming harsh season of summer or winter. This shedding is triggered by an internal mechanism that responds to annual circadian rhythm – the length of daylight.

During the spring / fall equinox, ambient temperatures are stable and a relatively safe time for an animal to shed – it's not too hot, not too cold. This shedding results in thinning of old hair to make room for the new hair that will protect against the coming extreme climate in the next few months. The spring equinox shed thins the coat for warmer weather; the autumnal equinox sheds the summer coat of older hair to make room for a thicker coat.



Pets shed twice yearly in Fall and Spring, when Circadian rhythm dictates



Pet food manufacturers have traditionally modified these nutrient levels for lifestyle or breed type, but not for ambient temperature — essentially offering flat line nutrition for every season, lifestyle and breed.

4 - Nutrient needs of dogs and cats are related to ambient temperature fluctuation

Nutrient profiles of protein, fat and carbohydrates influence the amount of kcal availability in manufactured pet foods. The amount of these nutrients varies with each pet food product.

Manufacturers have traditionally modified these levels by lifestyle or breed type, but not for ambient temperature, essentially offering flat line nutrition for all the seasons, lifestyles or breed.

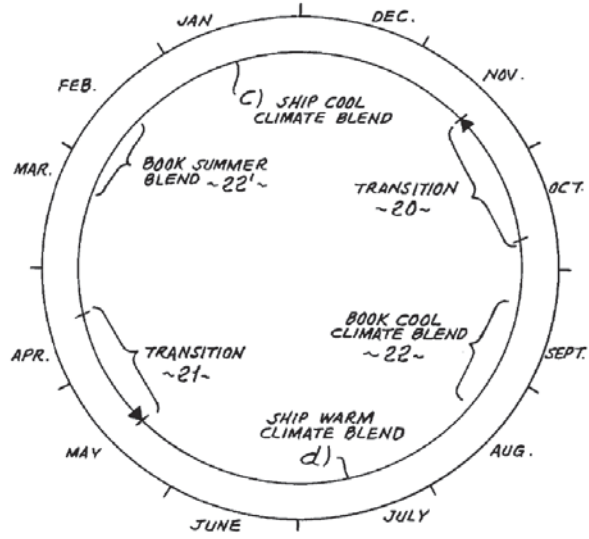
In the case of the thermal neutral zone.... kcal's, protein and fat levels are established by the NRC to meet minimum levels for growth and reproduction of 22% protein and 8% fat in order to be labeled a “complete and balanced diet.” Factual evidence is published on the effect of ambient temperatures in NRC's guide, *Nutrient Requirements of Dogs and Cats*, chapter 11, and other studies cited in section 1 above.

Before now, the importance of the effects of ambient temperature on a pet's metabolic rate has been overlooked by the pet food industry. The subject has never been discussed or factored into a commercial pet food on any serious level. Published studies discussing the effects of ambient temperature on domestic pets document the fact that all living beings are subject to very real variances in nutritional requirements for life on earth.

5 - Seasons Natural® Patented climate-specific nutrition



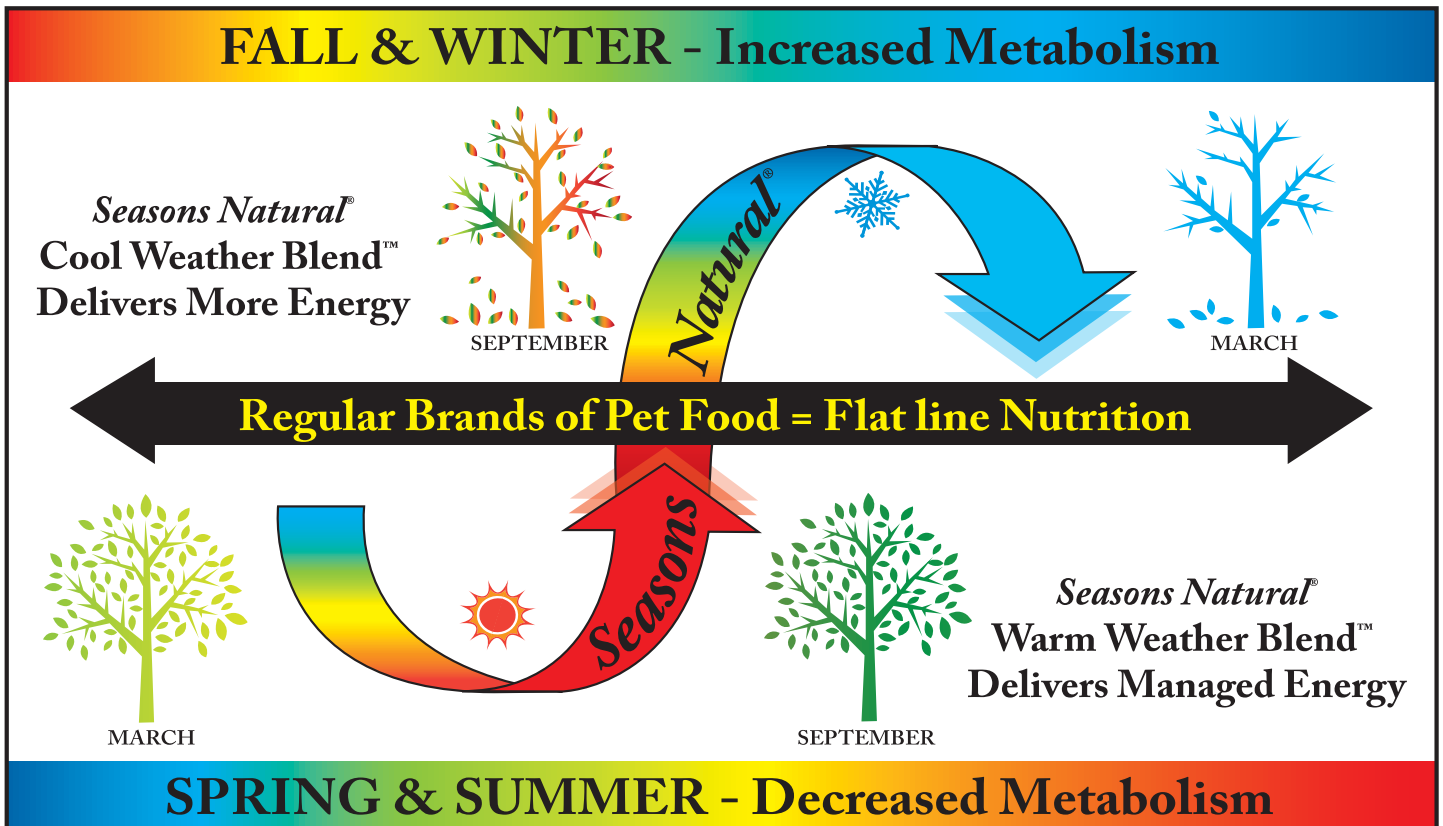
Fig 5-1 Patent Illustration
 Northern Hemisphere
 US #7,122,588 B2;
 Southern Hemisphere
 Australian #2004304885;
 global patents pending.



Published facts on the effects of ambient temperature are well documented – yet most people have missed the big picture: all living beings are subject to very real, physiologically imbedded nutritional requirements for life on earth.

(57) ABSTRACT

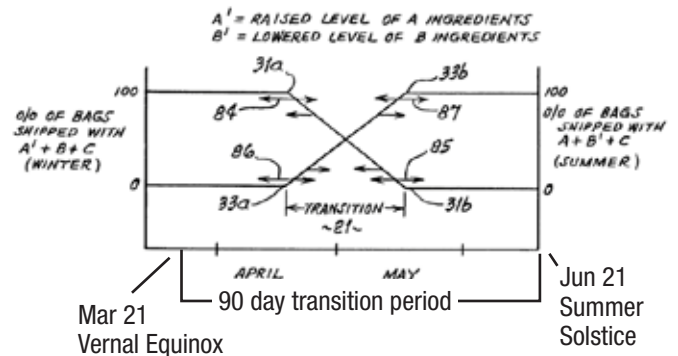
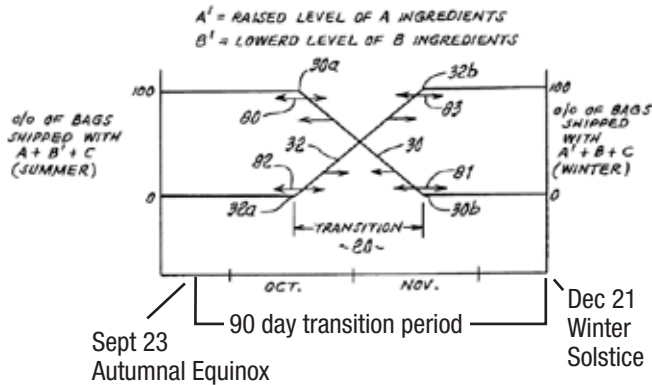
The method of selectively climate controlling the formulation and distribution to points of sale to customers of pet food.



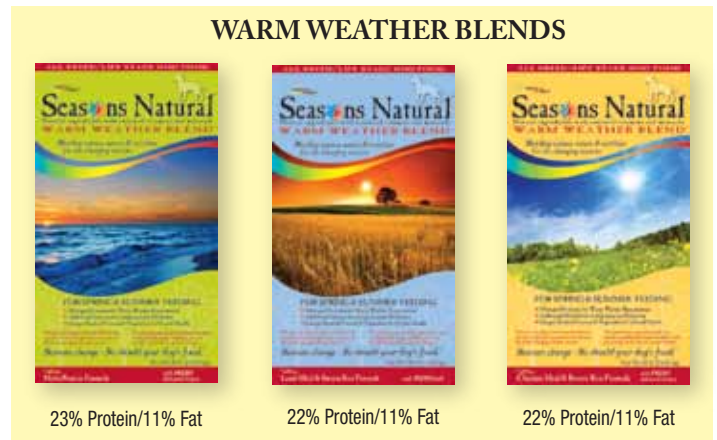
Seasons Natural® is scientifically designed to match your pet's nutritional needs with the seasonal ebb and flow of nature.

What does Seasons Natural® do that no other pet food can?

Seasons Natural® manipulates protein, fat and carbohydrate levels to match increasing MER requirements of companion animals in cool weather; and decrease protein, fat, and carbohydrate levels to meet the seasonal demands of warmer weather.



Excerpt from US Patent # 7,120,588B2
 Patent Fig 5-3 and Fig 5-4



3 great flavors come in both COOL and WARM seasonal formulations:
 Multi-Protein Formula • Lamb Meal & Brown Rice Formula • Chicken Meal & Brown Rice Formula



Conclusion:
Seasons Natural® is the most scientifically advanced pet food in the world – and the only pet food to address the varied climate demands on MER.

Base ingredients in each Seasons Natural® formula are the same, but the quantity contained will change in % of base ingredients, to achieve a 3% fluctuation in guaranteed analysis, but a much higher increase /decrease of 13.6% in protein and 27.2% in fat between the cool and warm blends. This patented process optimizes a functional movement of nutrients for seasonal advantage.

Conclusion: this patented climate change optimization makes Seasons Natural® the most scientifically advanced pet food in the world – and the only pet food to address the varied climate demands on MER.

Visit seasonspetfood.com for more information

Seasons change - So should your dog's food.™



Seasons Change. So Should Your Dog's Food.™ Why?

In the wild, animals forage the seasonal foods presented by nature in preparation for the upcoming season. A wild animal's diet changes with the seasons. At Seasons Natural®, we have employed the latest advances in pet nutrition to provide pets with a diet that is seasonally appropriate, just as nature intended.

Seasons Natural® properly regulates the amount of digestible metabolic energy available when dogs need it, as dictated by the seasons.

- *Cool Weather Blend™* with higher fat and protein, as well as L-Carnitine to help dogs utilize fats more efficiently and create lean muscle mass
- *Warm Weather Blend™* providing a carefully-managed level of protein, fat and overall calories, with micronutrients selected to promote health during warm weather

Features:

- All blends contain natural, high-quality proteins such as lamb meal, chicken meal, and fish meal
Benefits: Ideal amino acid profile for a healthy, lean body condition and a strong immune system
- Guaranteed levels of two powerful antioxidants: Vitamin E and beta-carotene
Benefits: These antioxidants help destroy free-radicals, protecting your pet's overall health.
- High quality brown rice, grain sorghum and oat groats are blended for a diversified carbohydrate profile.
Benefits: These whole grains provide an all-day energy source and natural fiber for digestive health.
- Optimal blend of Omega-6 and Omega-3 fatty acids
Benefits: These fatty acids support a healthy skin and coat, as well as strengthen the immune system and aid in controlling inflammation.
- Fortified with fruits and vegetables
Benefits: Natural sources of antioxidants and fiber.
- Formulas contain inulin and other natural fiber sources
Benefits: Promote healthy digestion by supporting the natural flora in the digestive tract.

Additional Features:

- All blends are naturally-preserved and are formulated to meet the nutritional levels established by the AAFCO (Association of American Feed Control Officials) Dog Food Nutrient Profiles for all life stages
- Eco-friendly packaging; recyclable, compostable bags

