

**Nutrition in Dogs  
Karen Hedberg BVSc  
2007**

**Canine Nutrition**

**Main requirements :**

- The dog is a carnivore
- Dogs can vary considerably at different stages of their life in their requirements for energy, fat and carbohydrates
- Environmental factors
- Genetic variation

**The dog is a carnivore, therefore .....**

- meat and meat products are highly digested.
- cereal and cereal based foods have poorer digestion levels, especially the LESS processed they are.
- the relative availability of various components and minerals within the diet will vary widely according to the digestibility of the diet.

**The dog is a carnivore .....**

- an enormous range of diets can be fed to adult dogs with generally good results.
- availability of and digestibility of essential components of diets being fed to dogs under situations of heavy demand (rapid growth, pregnancy, lactation and heavy work) can become critical to the health, growth and future wellbeing of the dog.

**Dogs can Vary Considerably in their Requirements**

Dogs can vary considerably in their requirements for energy, fat and carbohydrates depending on :

- their age and rate of growth,
- breed (and end weight range)
- demand periods – pregnancy, lactation.
- level of activity – maintenance, light work, heavy work.

**Environmental factors :**

- **Temperature :**
  - cold increases the energy demands,
  - hot weather lowers demand for energy
- **Level of protection from the elements :**
  - kennelling,
  - amount of coat and age of the dog.

**Genetic variation :**

- genetic variation between breeds
- rate of maturity
- individual variable metabolic rates
- genetic disorders affecting metabolism, absorption of foods

**General Nutrition Facts****Aim of a Diet :**

- The aim of any diet is to provide adequate water, energy in the form of proteins, essential fatty acids, carbohydrates which should contain essential vitamins, minerals and amino acids sufficient for growth, maintenance and heavy production situations.
- If the diet fails to provide complete and adequate amounts of any of these macro and micronutrients, problems can develop over time such that there can be impairment of growth, decreased performance, slower healing rates from injury or stress situations, increased susceptibility to infections, as well as the early onset of degenerative conditions (Lewis et al 1994, Simpson et al 1993).

**Nutrients :**

- Nutrients work together - it requires the presence of all nutrients at adequate levels for different pathways to function properly.
- If a pathway requires 10 different nutrients and one is severely deficient in the diet, the same results may occur as would the absence of all 10 nutrients. (Williams, Kalita 1977).

**General Nutrition facts:-**

- Base level of required nutrients have been developed (NRC guidelines), that show the average requirements of healthy dogs, but do not take into consideration actual food quality, digestibility and relative composition and availability of vitamins, minerals etc.
- The nutritional quality of foods varies widely depending on the sources of ingredients, composition of amino acids etc, and digestibility which is affected by the degree of processing, cooking and storing.
- NRC guidelines do not cover variation between breeds, individual variation and the increased needs under stress situations.
- Work continues to be done to understand the specific requirements of the various life stages of the differing groups of dogs - toys, medium, large and giant breeds.
- The specific needs of these different groups vary widely, particularly during rapid growth, reproduction, maintenance, heavy work and stress.

**Digestibility of diets in dogs**

- Dogs are carnivores and stand at the top of the food chain. They have a relatively short digestive system and food travels through the system relatively quickly.

- The more complicated foods such as cereals require time to digest.
- Plant material and cereals in a “raw” unprocessed state cannot be digested sufficiently in time to allow the dog to gain much value from it.

### **Digestibility:-**

- Meat and meat products are highly digested - around 80-85% digestible depending on the meat type.
- Meat - Muscle cell protein is easily digested and has very good balance of amino acids. Other proteins in meat eg. collagen and elastin are less digestible and have a poorer amino acid profile.
- Addition of meat to cereal increases the efficiency of absorption of most minerals. As most dry foods are over supplemented with calcium, do not need to add extra unless you go past a 1:1 basis, equivalent to one third or less of meat on a dry matter basis.
- Cereal and cereal based foods are poorly digested (compared to meat based foods, especially the LESS processed they are).
- Unprocessed cereals are very poorly digested by dogs. As Kronfeld said – “Have you ever seen a dog attack a wheat field?”
- Processing grain followed by light cooking enhances the digestibility of cereal protein.
- Over cooking impairs protein quality. Even cooked cereal has around 60% digestibility at maximum.

### **Availability of minerals:-**

- The high starch content depresses energy and protein digestion and the absorption of iron. High cellulose or fibre content will depress the absorption of calcium, magnesium and probably zinc.
- Commonly, the protein supplement is soybean meal or flour - both contain high amounts of phytins, which further diminishes the absorption of calcium.
- The calcium is then supplemented heavily which then interferes with the absorption of zinc and copper and interferes with the utilisation of iodine (uptake by the thyroid gland).
- Vegetable fibre can also depress absorption of magnesium, phosphorus and zinc and phytins reduce assimilation of zinc and iron. Starch will also decrease the absorption of iron.
- the relative availability of various components and minerals within the diet will vary widely according to the composition and digestibility of the diet.
- Availability of and digestibility of essential components of diets being fed to dogs under situations of heavy demand (rapid growth, pregnancy, lactation and heavy work) can become critical to the health, growth and future wellbeing of the dog.
- High fat content is valuable and poor digestibility is undesirable in high demand situations.

**Minerals in dry foods:-**

- Best selling dog foods contain about twice the NRC recommended levels of Ca, Zn, Cu; 4 x the level of iron and 12 x the level of manganese.
- In practice it is the lower fat pet foods that require more minerals because they are made from cereal grains (fibre and starch) and soya beans (phytins).
- Higher energy diets are associated with inclusion of more meat and meat by-products which should increase the efficiency of assimilation of minerals and thus reduce the amount of minerals required in the diet.
- Poorer absorption of these minerals in a cereal-based dry food risks poor growth, anaemia and greying.

**Different Stages of Life or Activity**

**Dogs can vary considerably in their requirements for energy, fat and carbohydrates depending on:-**

- their age and rate of growth,
- breed (and end weight range)
- demand periods – pregnancy, lactation
- level of activity – maintenance, light work, heavy work.

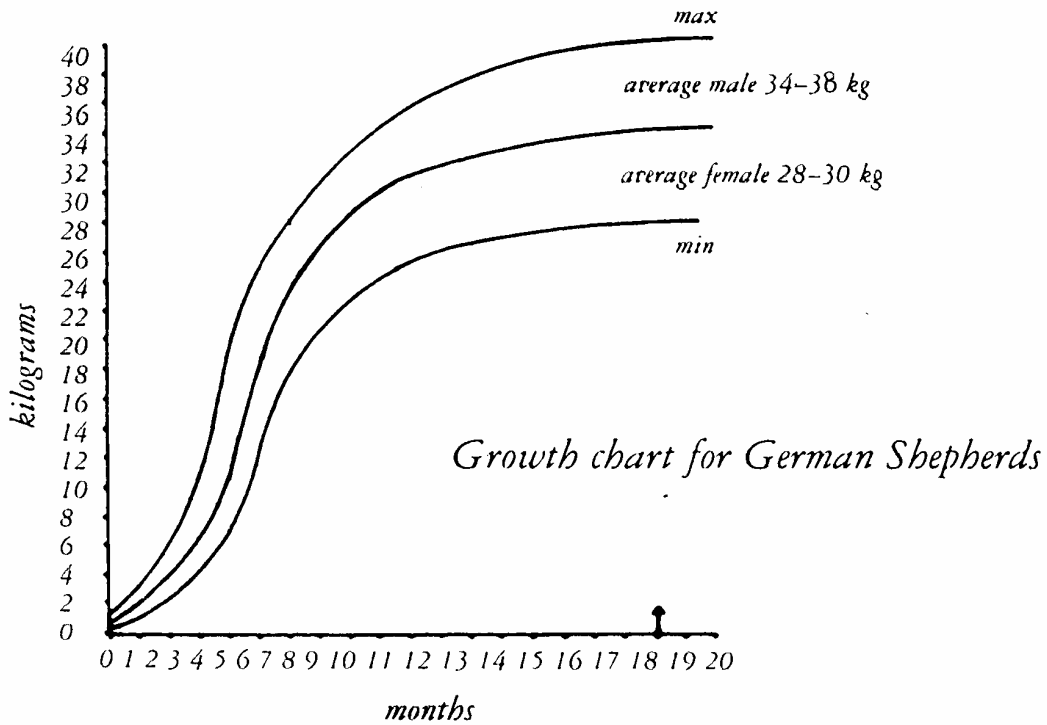
**Rapid growth (medium size breeds):-**

- Rapid growth – During this period, puppies need minimum 10 - 15% fat levels in the diet, with a 25 - 28% protein level.
- In the very early weeks almost doubling the weight per weeks for the first 2 weeks, then gaining proportionally at a very rapid rate until 6 - 8 weeks (depending on the breed).
- 8 - 16 weeks, the growth rate is still very fast – in the GSD, this translates to around 0.75 to 1kg per week in females and 1 - 1.25 kg per week in males.
- 16 weeks to 6 months slower gains (50% down on previous rate).
- 6 - 9 months and above – gaining very slowly.

**Rapid Growth: -**

- When looking at growth charts, there is always a range of weights that are normal for both males and females at any one stage of growth.
- With rapidly growing puppies, the aim is to grow puppies at a steady rate of weight gain and stay within the normal weight ranges of that breed at that age group

**GSD Growth Chart**



**German Shepherd Weight Growth Table**

approximate figures/ranges

Age Months	Male Range	Male Average	Female Range	Female Average	% Adult Weight
1	2.5-4 kg	3.5 kg	2- 3.5 kg	3 kg	10
2	6-9 kg	7 kg	5- 7.5 kg	6.5 kg	22
3	10-14 kg	12 kg	8-12 kg	10 kg	40
4	16-18 kg	17 kg	14-16 kg	14 kg	50
5	18-22 kg	21 kg	16-20 kg	18 kg	60
6	22-26 kg	24 kg	20-22 kg	20 kg	70
7	26-28 kg	27 kg	22-24 kg	23 kg	80
8	28-30 kg	29 kg	24-26 kg	25 kg	85
9	29-32 kg	31 kg	25-27 kg	26 kg	90
10	30-33 kg	32 kg	26-28 kg	27 kg	92
11	30-34 kg	33 kg	27-29 kg	28 kg	95
12	32-34 kg	34 kg	27-29 kg	28 kg	95
18	32-36 kg	36 kg	27-30 kg	28 kg	98
24	32-38 kg	37 kg	28-30 kg	29 kg	98
36	36-40 kg	38 kg	28-32 kg	30 kg	100

**Some Generalizations on Growth Rates in the GSD**

**Male GSD Growth Rates:-**

- Between 12 - 20 weeks on average are gaining up to 1 - 1.25 kg maximum per week,
- Between 20 - 26 weeks, gaining 0.75 - 1kg maximum per week,
- Between 26 - 35 weeks gaining 0.5 - 0.75kg per week.

Male GSD's largely stop growing in height by 9 months and may gain an extra 1cm (maximum) in height by 15 months.

Adult Male:

- 18 months, Average weight range 32 - 38kg (Average 36kg)
- 3 - 4 years, Average weight range 36 - 40kg (Average 38kg)

**Female GSD Growth Rates:-**

- Between 12 - 20 weeks are gaining up to 0.75 - 1kg maximum per week,
- Between 20 - 26 weeks, gaining 0.5 - 0.75kg maximum per week,
- Between 26 - 32 weeks, gaining 0.25 - 0.5kg per week.

Female GSD's largely stop growing in height by 8 months of age and may gain up to 1cm in height by 12 - 15 months of age.

Adult Female:

- 18 months - Average weight range 26 - 32kg (Average 28kg)
- Fully grown 2 - 3 years - Average weight range 26 - 32kg (Average 30kg)

**For most breeds:-**

The weight of a puppy (male or female) at 4 months is roughly  $\frac{1}{2}$  the adult end weight

### **Feeding Recommendations**

With the more palatable diets, and particularly those with high energy densities, feeding should be carried out with due regard to the desired end body weight of the dog, hence its energy intake.