



## Feeding the Working & Sporting Dog

By Ness Bird - Nutrition Adviser and RVN CertCFVHNut ©

### Introduction

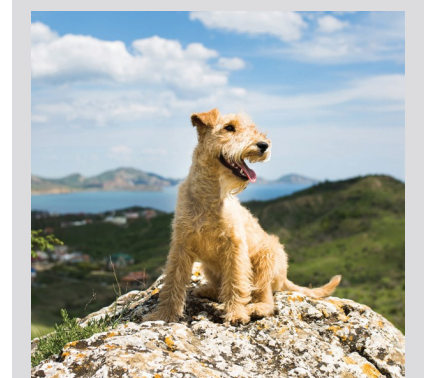
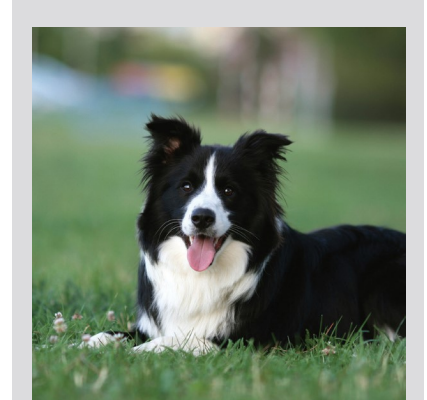
Training, exercise and appropriate nutrition are essential to ensure the working and sporting dog's optimal performance. Regardless of its format, the diet should be complete and balanced, highly digestible, and nutritionally valuable. Working and sporting dog foods are formulated to provide optimal energy intake, support the hard-working muscles, and ensure efficient blood flow. This helps to minimise fatigue and improve stamina. The energy necessary for endurance is derived predominantly from aerobic metabolism, which requires a good level of high-quality dietary fat. There is a shift towards anaerobic metabolism when the dog is sprinting, and this is supported by the carbohydrate in the diet which replenishes the muscle and liver glycogen stores. Commercial endurance diets typically supply 15% or less calories from carbohydrate, while a sprinter's diet supplies around 50% [Hand et al, 2010]. Many working and sporting activities require middle ground to ensure both stamina and speed, with needs depending on:

- The type, duration, frequency, and intensity of exercise.
- Environmental factors such as terrain, temperature, and humidity.
- Individual variants including temperament, neuter status, age, digestion, and metabolic rate.

Working lines are typically strong, agile, and enduring. However, the working/sporting dog may be at increased risk of injury and stress as a result of physically demanding activities. Correct nutrition helps the digestive system work efficiently, allowing the immune system to focus on its primary protective role, without being waylaid by ingredients that hinder the metabolism, such as poorly digested proteins that are more likely to provoke allergic responses, and those that upset the digestion or require a great deal of work to be properly assimilated. Excessive faecal bulk can slow down the dog.

### Appropriate Nutrition from the Start

By promoting healthy growth through an appropriate diet from puppyhood, your adult dog will develop strong bones and joints, and a well-muscled frame. Well-developed neck and shoulder muscles allow for a greater lung capacity, better endurance, and the power necessary for carrying out his duties or sports to his best capability. Injury may not be preventable by sensible feeding, but incidences may be reduced, or recovery facilitated more speedily. A strong and healthy body which is protected by an equally strong and healthy immune system has greater healing capacity. Some sources do not advocate puppy foods, and indeed some commercial adult diets are safe to feed to dogs of all ages. However, the advantage of a growth specific diet is that the nutrient values are tailored specifically for developmental requirements rather than to encompass a much broader market.





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You may think a particular puppy product appears very similar to an adult food in terms of its protein and fat content, but there is much more to dog food than what is visible on the label – for example this will not show you individual amino acid concentrations or the full spectrum of vitamin and mineral levels that the diet provides. The working/sporting dog will benefit from nutrients that help to support the additional stresses imposed upon the bodily systems. The immune, cardiovascular, and musculo-skeletal systems are under extra strain during any period of prolonged physical exertion. Psychological health is just as important as physiological health, and the nervous system may also benefit from nutritional support helping promote mental alertness and improve concentration levels. Starting a sympathetic diet early in life means your dog can reap the benefits from the outset.



## Feeding Routines & Regimes

It is not just what is fed, but how it is fed that is important too, with timing and frequency being of great relevance. You want to ensure your dog has sufficient energy at times when he needs it, but also avoid heavy meals immediately before or after exercise (which may help reduce the risk of bloating – a notorious problem for large, deep chested breeds). Historically, working dogs were fed once daily, allowing them to eat after their day's work and digest whilst relaxing afterwards. Many working dogs are still fed once daily without any issue, but some fare better with two meals per day (potentially more in the case of sensitive digestion) because this means less work for the gut at any one time. Underweight dogs will often benefit from a third feed because the daily feed volume can be increased without providing overly large meals. This can be advantageous to those prone to reflux too since an accumulation of secreted acid in the stomach can result from long periods between feeds. Large meals can further exacerbate this condition because an overly full stomach places excessive pressure on the diaphragm, causing acid to travel upwards.

More frequent meals may also be beneficial for fussy eaters, greedy dogs and those prone to over-exuberance since this may help to promote more stable blood sugar levels. When insulin is low, less of the “feel good” hormones – dopamine and serotonin – are produced. As a result, high amounts of adrenaline are secreted to raise blood sugar levels, and this can result in agitation and reactivity. It can also cause the food to be rushed through the digestive tract too quickly meaning less time for efficient absorption of the nutrients. “Adrenaline poos” are a very common problem in excitable and/or nervous dogs.

## Calories

The working/sporting dog's diet should be sufficiently calorie dense to be able to meet increased energy needs without overloading the digestion. Energy requirements are governed by many factors, and for most intermediate activities, vary from 2-5 x RER (resting energy requirement). For sprinting, it is lower at 1.6-2 x RER [Chandler, 2015]. It is recommended that endurance dogs be fed a diet which supplies a minimum of 4000 kcals/kg, and that calories from fat contribute 50-65% of the daily intake [Case et al, 2011]. Dogs involved in activities that require both stamina and speed will likely benefit from around 40% of their calorific requirements being derived from fat, as this will allow higher carbohydrate proportions.

Even during rest periods, a working or sporting dog's calorific requirements will still exceed those who lead a more sedentary life-style due to the increased level of fitness and greater muscle mass.

## Calculating % Calories Supplied by Macro Nutrients

If you know the “as fed” protein, fat and carbohydrate levels of your dog's diet, you can calculate the percentage of calories each nutrient will provide.

Example: Arden Grange Performance - which supplies 25% protein, 18% fat and 40% carbohydrate (these do not total 100 because insoluble fibre, moisture and ash do not need to be included as they do not supply calories).



1. Multiply each nutrient by its Atwater Factor (how many calories are supplied by 1g of pure protein, fat and carbohydrate): -

a) Protein [25 x 3.5] = 87.5

b) Fat [18 x 8.5] = 153

c) Carbohydrate [40 x 3.5] = 140

2. Multiply by 100 and then divide by the sum total of protein + fat + carbohydrate: -

a) Protein [87.5 x 100 divided by 380.5] = 22.9% of calories provided by protein

b) Fat [153 x 100 divided by 380.5] = 40% of calories provided by fat

c) Carbohydrate [140 x 100 divided by 380.5] = 36.8% of calories provided by carbohydrate

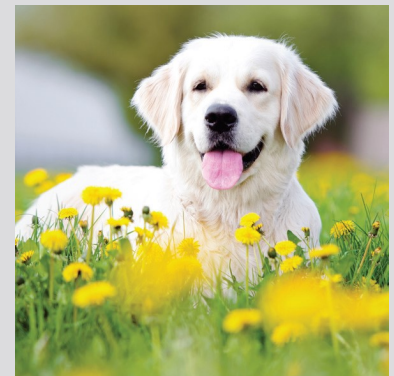
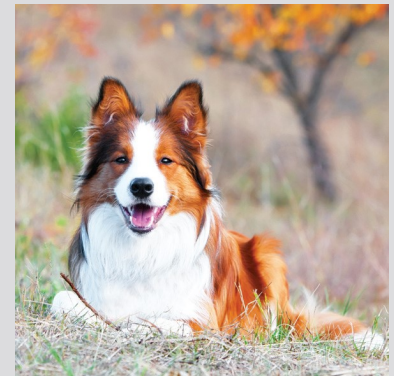
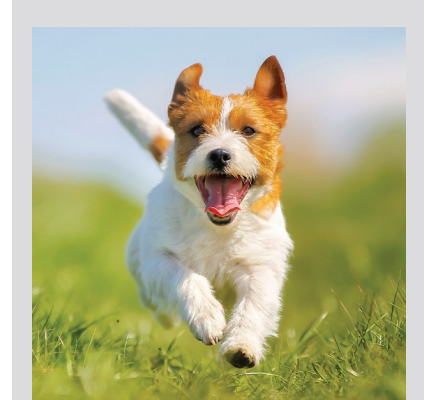
This nutrient balance is suitable for many working/sporting dogs, but every dog is an individual, and those undertaking more enduring activities may fare better with a diet that provides more fat and less carbohydrate such as the Arden Grange Prestige. Experienced owners will know what suits their dogs best. Adjustments will likely be required to suit variances in workload and external factors such as weather conditions.

Climate is an important nutritional consideration for working and sporting dogs. The life-essential chemical reactions within the body's cells can only be carried out within a defined temperature spectrum (known as the neutral range). Dogs (and other mammals) have complex built in metabolic mechanisms to maintain their body temperature, but thermoregulation can only be optimised when the correct fuel is available to support the multiple bodily systems involved. Namely the respiratory, cardiovascular, endocrine, nervous, urinary, and integumentary systems.

Even just altering the daily volume can make a significant difference as the intake of every nutrient when calculated in grams per day is dependent on the quantity fed. It is not possible to reduce or increase the intake of one nutrient, without increasing or decreasing another. So, for example, changing to a lower protein (dry) food would typically increase the carbohydrate intake since all nutrient levels must add up to 100.

### Fats & Oils

Fat is a concentrated source of fuel which is needed to enable the muscles to efficiently utilise free fatty acids as an energy source, and a fat-dense diet stimulates mitochondrial growth and improves aerobic work capacity [Davenport, 2002]. Working and sporting dog diets generally have moderate to high fat levels because energy dense feeds mean that increased nutritional demands can be met without having to feed large volumes of food that take longer to digest and metabolise. Higher fat diets also have a glycogen sparing effect, which is important because glycogen depletion causes fatigue. An outdoor dog's metabolism changes during cold weather, and fat rather than glucose is preferentially used for energy, so increasing fat intake during heavy winter work is normally beneficial. Good fat sources for the working/sporting dog include those with high levels of Omega-3 EPA and DHA such as krill.







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These essential fatty acids have many health benefits because of their anti-inflammatory properties. They are excellent “brain food” - DHA is a structural component of the brain, whilst EPA helps to protect it. Omega-3s are polyunsaturated fats, and their inclusion is very significant to the owners/handlers of dogs who need to use their noses in their work because studies have suggested that foods containing only saturated fats may impair the ability to detect low concentrations of odours [Altom et al, 2003].

### Protein

Protein is critical, and quality is more important than quantity, providing your dog’s needs are met. Although working and sporting dogs have a higher requirement for protein than sedentary dogs, excessive levels serve no benefit because amino acids cannot be stored. Firstly, nitrogen is removed and excreted as urea in the urine. The resultant alpha keto-acids are then turned into triglycerides and stored in the fatty tissues, or glucose to be used as fuel for energy. The latter only happens if there are insufficient calories from fat and carbohydrate.

Although meat proteins are generally more digestible and bioavailable, certain plant proteins have benefits too. The zein protein within the much-maligned maize for example is actually a very good source of the essential amino acids methionine and cysteine which are required for the manufacture of taurine (very important for cardiac health).

The ideal working/sporting diet will contain a moderately high (but not excessive) level of protein with a high biological value (i.e., very digestible and easily assimilated) from diverse sources (ensuring an excellent amino acid profile) to promote optimal tissue growth and replacement. Research has suggested that this may reduce susceptibility to injury [Reynolds, 1995].

### Carbohydrate

As previously mentioned, protein can be utilised as an energy source, but it is not as easily assimilated as fat or carbohydrate. Although your dog does not have a specific requirement for the latter, he does need glucose which is the body’s primary fuel source. The consequences of low blood sugar have already been discussed, and a constant supply of glucose is required for the optimal functioning of the nervous system. Ingredients such as rice, maize and potato are good carb sources for dogs (subject to individual tolerance) and their inclusion in the working/ sporting dog’s diet will help to ensure protein is used for its multiple structural and functional roles as opposed to energy. Fibre also comes under the carbohydrate category, and there are two main types: soluble (usually fermentable, e.g., beta-glucans) and insoluble (usually non-fermentable, e.g. cellulose). Soluble fibre is used to produce short-chain fatty acids. It also delays gastric emptying and improves peristalsis (the muscular contractions that move food along the digestive tract). Insoluble fibre ensures an optimal transit time of food within the intestine, dilutes the colonic contents, and binds to toxins. Fibre is derived exclusively from plant cell wall material. The Arden Grange recipes all include beet pulp as this is a good source of both soluble and insoluble fibre.

#### Some attributes to look for in a working and sporting dog diet: -

- Good (but not excessive) levels of vitamins and minerals from bioavailable sources. **Calcium, magnesium and potassium** are especially important because metabolic acidosis induced by lactic acidosis may increase the excretion of these minerals.
- **Polyphenols and flavonoids** to provide antioxidant support against the physiological stress associated with working [Dunlap et al, 2006]. Examples include quercetin and green tea, which may help protect against free radical damage.
- **Added L-carnitine** – which is more commonly known for its benefits to the heart and as a metabolism booster (it transports fatty acids to the mitochondria which are the cells’ “energy packs” thus improving stamina), but it also benefits the brain in that it helps protect the nerve cells from damage. In people it may improve memory and mental function.



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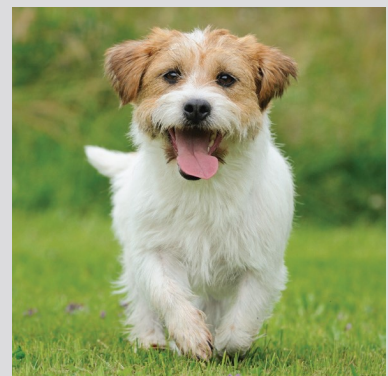
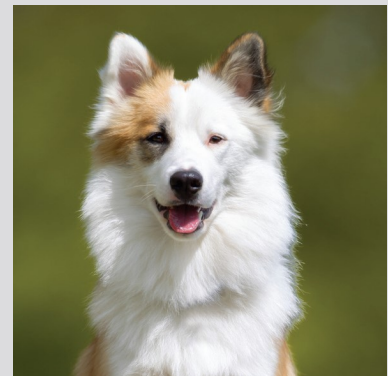
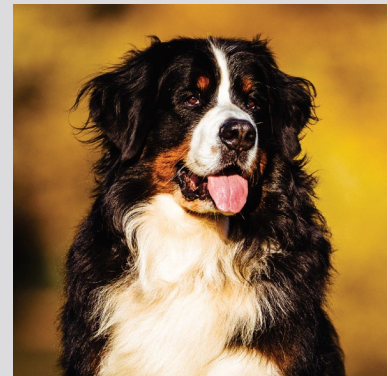
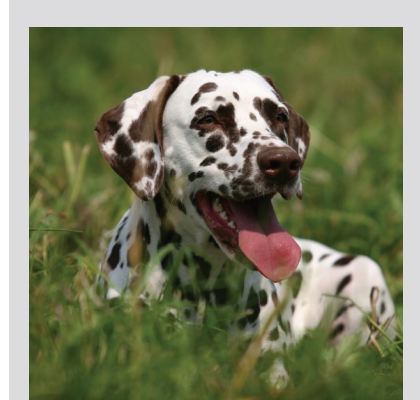
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- **Added taurine** – which is essential for normal contraction of the heart muscles. Taurine may also help calm the nervous system by reducing stress related adrenaline spikes.
- **MSM** – a form of organic sulphur which may benefit the working or sporting dog due to its antioxidant, anti-inflammatory and cell-rejuvenating properties. [Faerber et al., 2004]. The brain is very sensitive to the effects of toxic heavy metals and organic compounds which can accumulate in nerve cells causing severe oxidative damage and resultant neurological disturbances. MSM is one of the few antioxidants which can readily transfer across the blood-brain barrier, and it may help to improve mental alertness by increasing the availability of oxygen to the body and brain.
- **Glucosamine and chondroitin** – to support hard-working joints. Glucosamine provides the building blocks to synthesise new joint cartilage, whilst chondroitin blocks destructive enzymes that break down cartilage in the joint. There is always a low level of these destructive enzymes in the joint, but when injury or abnormal wear occurs, these enzymes multiply.

Arden Grange Performance boasts all the above supportive elements.

## Brain-Gut Connection

The relationship between the brain and the gut is an interesting subject, and this is one of the reasons why the provision of a highly digestible diet is of such great importance to your working/sporting Shepherd, who will benefit from both psychological and physical support in order to promote optimal performance.





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Diets that include **digestive nutraceuticals** (functional ingredients that have a positive influence on gut health) may be beneficial to your working/sporting dog. **Prebiotic FOS** (fructo-oligosaccharides) is one such example. This type of prebiotic can only be broken down by the friendly gut bacteria, and when this takes place, the energy that is produced is utilised by the beneficial flora and enables them to reproduce efficiently. In simple terms it is an excellent food source for the friendly gut bacteria. A thriving colony of the good gut bacteria may limit the growth of pathogenic bacteria. **Prebiotic MOS** (manno-oligosaccharides) act as a “gut security guard”, mopping up pathogenic organisms and helping to transport them out of the body. **Every Arden Grange recipe includes both prebiotic FOS and MOS.**

Nucleotides are another example, and these are the “food” required to produce genetic material. They are naturally produced in the body, but some cells (including the brain cells) cannot produce enough to cover requirements. More nucleotides are needed to help overcome the negative effects of the stress hormones cortisol and adrenaline, and increase immunity [De Godoy et al, 2016]. In terms of digestive health, they are especially useful because they increase the surface area for the absorption of nutrients within the small intestine, which may improve the efficiency of the digestion. Nucleotides also support immunity as they help the defence cells to replicate more quickly when challenged, e.g., by infectious organisms. **Every Arden Grange recipe includes nucleotides.**

## Fluids

Water is a critical nutrient and used as a solvent, transport medium and lubricant. Soaking dry food for about ½ hour prior to serving can help to increase the fluid intake. If the body’s hydration status is not maintained, then athletic performance is quickly impaired. Drinking water is the primary source of fluid, and it is the most vital nutrient. Approximately 70% of a lean adult animal’s body weight is water, and it is a crucial component of many tissues. It is needed for most metabolic processes and chemical reactions within the body. It helps absorb heat generated by metabolic reactions thus helping maintain stable body temperature. Temperature regulation is further aided by the ability of water to transport heat away from the organs via the blood. Digestion could not happen without it because it is needed for hydrolysis (breaking down large molecules into smaller ones) and it also provides the aqueous solution which facilitates action of the digestive enzymes. Water is needed for excretion too. Although the body can produce “metabolic water” (during oxidation of energy containing nutrients) this only accounts for a small proportion of fluid, so drinking is essential.

Fluid intake may be increased by the following means: -

- Soaking dry food – pour hot water over the kibble and leave it to steep under a clean tea towel for about ½ hr before serving. Once the kibble has absorbed the fluid, add a little more, mix and serve.
- Consider feeding some good quality wet (or fresh) food. **Arden Grange** produce a small range of canned products (**Partners**) – available in 3 tasty varieties.
- Invest in a pet water fountain. There are lots of different designs to suit different face sizes/shapes and drinking styles. Some are for indoor use, others encourage water play so are best outside.
- Some dogs are opportunistic drinkers and will not actively seek a water bowl unless they are very thirsty, but they may take a drink if they are passing one. Keeping several water stations in the home and garden can be helpful.
- Trying offering filtered water or bottled water (but if using the latter, make sure it’s pure water and not enriched with additional minerals). Dogs have special taste buds for water which are very sensitive, and tap water is not always that appealing (hence why they often prefer to drink from puddles!)
- Adding a palatant such as a little low sodium (onion-free) chicken broth. Plain, fresh water should also remain available.
- Bringing the water up to body temperature, particularly if the dog is cold or over-tired.







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