Diet and Its Effect on Injury Rates
Protein use increases during exercise and this continues to increase with exercise duration. Low protein diets have been shown to increase injuries in exercising dogs. A study by Reynolds, showed that changes in dietary ME protein from 19% to 24%, resulted in 8 times as many soft tissue injuries for the lower protein diet. These included many of the ligament and tendon injuries we commonly see in your working dogs. This is great evidence for feeding your dog a diet with a minimum of 24% protein.

Time of Feeding and Exercise
Feeding prior to exercise can cause abdominal pain and vomiting during exercise. Giving a small feed prior to exercise has not been shown to increase endurance capacity. Feeding immediately after exercise promotes recovery and replenishes muscle stores of both glycogen (carbohydrate) and protein. These are replenished more completely and rapidly when food is given within 2 hours of exercise. Feeding working dogs once a day meets many of these requirements. However, during periods of high exercise levels some dogs may not be able to physically eat enough food in one sitting to fully replenish what has been used.

Feed Utilisation
The preferred fuel that muscle likes to use is fat. Fat is the most efficient fuel but is slow to burn. As the intensity of exercise increases, the proportion of fat drops and carbohydrate increases as this can be burnt rapidly. Exhaustion results from the depletion of the muscle carbohydrate stores.

Effect of Diet on the Type of Fuel Utilised
The proportions of fat, protein and carbohydrate influence the fuel selection during exercise. Feeding a high fat, low carbohydrate diet increases muscle storage of fat and utilisation of fat, therefore increasing endurance by preserving muscle glycogen (carbohydrate) stores. You may be wondering why don’t we feed high carbohydrate diets? High carbohydrate diets do increase muscle carbohydrate storage but also increase carbohydrate utilisation. This negates any benefit of feeding high carbohydrate diets and glycogen (muscle carbohydrate store) storage is preserved much more effectively by feeding high fat diets.

Training
Muscles adapt to the type of exercise they are required to do. The type of work farm dogs are required to do results in adaptations specific for endurance exercise. Training increases the number of mitochondria which make energy in the muscle cells by ‘burning’ a fuel with oxygen (endurance exercise); muscle spares carbohydrate and chooses to use fats to provide most of the energy required.

If you do choose to change to a new diet, please do this gradually to avoid gut upsets such as diarrhoea.

I hope this information helps you to think about the diet you are feeding your dog. It should allow you to make informed decisions about the diet you choose to feed and enable you to get the best performance out of one of your hardest working members of staff.

If you have any questions or would like more information please contact me at the clinic or email me at juan.gray@vetent.co.nz.
**Benefits of Feeding Working Farm Dogs Properly**

### Dogs are Athletes

Dogs are brilliantly adapted for endurance exercise when compared to cats, or people. The majority of muscles found in dogs have a massive capacity to use oxygen when exercising. They can use oxygen at a rate 5 times higher than cats. The ability to use oxygen is what gives us the capacity for endurance such as marathon runners compared to sprinters. Dogs also have muscle suited to high intensity sprints and so could be considered the complete athlete.

To allow your dog to reach this unique potential we need to provide the right fuel, as well as vitamins and minerals. Their digestion is quite different to ours, meaning we have to cater for this too.

**Please use the following key points to inform your decision on how you feed your dog.**

- Working dogs should be fed high fat diets to increase endurance.
- Feeding higher protein diets have been shown to significantly reduce exercise induced injuries.
- After exercise dogs should be fed within 2 hours, to replenish muscle stores more completely, promoting endurance.
- Dogs should not be worked within 8 hours of a small meal, or up to 16 hours following a large meal. This allows complete stomach emptying.
- Feeding unbalanced, incomplete raw meat based diets is to be discouraged.
- Ensure your bag of food is used within 6-8 weeks of opening. The fats will go rancid over time losing their nutritional value.
- If your dog is losing weight choose the most dense, easily digestible, high quality ingredients food possible. More than 1 feed a day maybe required.

- Compare the ingredients list as well as the protein and fat percentages when choosing a commercial diet.
- Compare prices accurately using the recommended feeding requirements for weight, on a per day basis. Don’t base it on the price of the bag!

I have found there is a very small difference in the cost per day throughout many of the more familiar brands but a large difference in quality.

### Common Feeding Problems

A common complaint from farmers is that they are unable to keep weight on some dogs. These dogs are often their best dogs and so get chosen to do the majority of work. Dogs can use a massive amount of energy during a days work, 2-3 times the amount an average person would use each day. As a result, depending on what is being fed, enough food cannot physically be eaten in one sitting to replenish nutrients used up.

**Could you eat 10 times the amount you eat each day?**

You may need to introduce small, additional feeds as well as the typical large daily meal. Ensure that you are feeding the most energy dense, high fat and high protein percentage food possible. Those not required to work as hard often get by on a poorer quality diet. You will find that your best dogs will be able to do more work if fed a better diet.

**What do you feed your dog?**

In New Zealand the majority of working farm dogs are fed a combination of home-kill and commercial biscuits. A study in 2008 found that on average, diets consist of 60% whole carcass or meat and 40% commercial dry food by weight, of which Tux made up the majority.

**What is the Ideal Working Dog Diet?**

The common practice of feeding a meat based diet with a commercial biscuit may approach the ideal proportions of the major components being high protein, high fat and low carbohydrate. However, these diets are likely to be low in several nutrients such as calcium, copper, Vit E, Vit D, Vit A and Vit B12. The less of the high carbohydrate commercial diet fed the higher the protein and fat content will be, but the diet will become more unbalanced and deficient than before. The use of a high fat, high protein commercial diet that has passed feeding trials is sufficient and no additional supplementation will be required. The feeding of incomplete, unbalanced meat based diets to working dogs should be discouraged.

**Commercial Dog Feeds**

There is a large variability in the levels of fat, protein and carbohydrate levels in commercially prepared diets. As already discussed, these diets should have the highest levels of readily digestible fat and protein possible. Unfortunately these are also the most expensive parts to incorporate into a diet and so cereals which are cheap are often used in these feeds instead.

**Things to Remember when Selecting a Commercial Diet**

1. Compare the percentage of protein and fat on the packaging. Other than small amounts of minerals and vitamins the remainder will be carbohydrate, often not listed. Aim for a protein + fat combined total of at least 50%
2. Diets with a protein level of >25% reduce injury rates and are commercially available.
3. Read the ingredients list. Ingredients have to be listed in descending order; the first ingredient is the largest component of the food, etc. The first ingredient should be an easily digestible high quality protein source, ideally of animal origin e.g. chicken, beef.
4. The food should have a greasy feel or make paper go translucent. This indicates fat levels.