

## Healthy eating—lessons from the horse's natural diet Part II

Christine King BVSc, MACVSc, MVetClinStud

In the first article (*Healthy Eating Part I*), I began discussing the horse's natural diet—the types of foods the horse's body is naturally designed to use—as the foundation for good health and performance. As a quick reminder, the horse's system is designed for fairly continuous intake of high-fiber, low-carbohydrate (i.e. low-starch, low-sugar), low-fat, living plant material from a wide variety of plant species. I discussed the horse's need for dietary fiber, and the general amount required. Now let's go on.

### **The natural diet is low in carbs**

For most of the year, the horse's natural diet is low in simple carbohydrates (starches and sugars). Instead, complex carbohydrates (dietary fiber) form the basis of the horse's diet and meet the bulk of the horse's energy needs. *Grains form a miniscule proportion of the total diet.*

### ***Terminology***

First, a quick primer on terminology. In nutrition circles, starches and sugars are variously termed simple, soluble, or nonstructural carbohydrates. (More and more you'll see the NSC, or non-structural-carbohydrate, content of various horse feeds listed on the label or in the product literature. That's basically an indication of the amount of starches and sugars in the feed.) Foodstuffs that are high in simple carbs include grains, lush grass, molasses, sugar, and sweet fruits (e.g. apples).

Starches and sugars are readily broken down to glucose by digestive enzymes in the horse's saliva and small intestine. The glucose is then absorbed into the bloodstream and used for energy production or converted to fat if the horse does not need it immediately.

Complex carbohydrates include cellulose and hemicellulose. They are large, complex molecules which give plants their structural integrity (form, strength, and resistance to bending or breaking). Hay and mature pasture are high in complex carbs, as are beet pulp, soy hulls, and other novel sources of digestible fiber.

These structural carbohydrates cannot be broken down by digestive enzymes and thus do not yield glucose directly. They can, however, be broken down by bacteria and other microbes in the horse's large intestine. Microbial breakdown of these complex carbs yields volatile fatty acids, which are absorbed into the bloodstream and used as a primary energy source or converted to fat and stored for later use.

### ***Grain***

Grain has been fed to horses for centuries, perhaps even longer. It is part of the lore of horse husbandry. (What do horses eat? Hay and oats.) However, there is one very important difference between the horse of 100 years ago and today's horse. At the start of the last century, most horses did a hard day's work 6 days a week, and they needed to be fed accordingly. Feeding today's pleasure horse the same way last century's draft or carriage horse was fed can cause a lot of problems. (More on that in a moment.)

As I demonstrated in the previous article, the average adult horse in good body condition and in light work *does not need grain*. His need for calories (energy), as well as for protein, calcium,

phosphorus, and most other minerals, can be met just with good quality roughage (pasture and/or hay). The horse may need a supplemental source of minerals and certain vitamins, depending on the quality and variety of the roughage sources, but he does not need grain to meet his energy needs.

Horses in more demanding jobs or life situations (e.g. late pregnancy, lactation, growth) often need more calories than can be provided by roughage alone. But even in these horses, grain should be fed with a light hand. One of my favorite sayings about feeding horses came from an equine nutritionist: “*Grain should be fed only as a supplement.*”

Regardless of the horse’s size and activity level, her diet should be based on good quality roughage (pasture and/or hay), in the order of 1.5% to 3% of body weight per day. Grain-based feeds should be added only if necessary—and *only as much as necessary*—to meet the horse’s additional needs for work, pregnancy, lactation, growth, and perhaps for recovery if illness, injury, or neglect has left the horse severely underweight.

High-grain diets (more than about 5 lbs of grain-based feed\* per day) are incriminated in a wide variety of problems in horses, including these:

- colic
- other digestive disturbances (diarrhea, gastric ulcers)
- laminitis (“founder”)
- exercise-related muscle dysfunction (“tying up” in all its forms)
- developmental orthopedic disorders in young horses (OCD, phytitis, angular and flexural limb deformities, wobbler syndrome, etc.)
- insulin resistance and all its consequences (obesity, increased risk for laminitis, other metabolic and degenerative disorders)
- behavioral problems (flighty temperament, sour attitude, “stable vices”)

(\* Grain-based feed includes grain in any form and any sweet feed, pellet, or other product whose first ingredient is grain, whether whole, crushed, ground, micronized, or otherwise processed. If the first ingredient on the feed label is a grain, then it’s a high-grain—i.e. high-starch—food.)

When a horse’s energy needs cannot be met by roughage and a few pounds of grain-based feed, it is better to add fat to the diet than to increase the amount of grain. Even so, it is best to first increase the amount of roughage fed, before adding a foodstuff that is more calorie-dense, more expensive, and less biologically appropriate (e.g. grain-based feeds, fat in any form).

### ***Lush grass***

When grass is rapidly growing, such as in the spring and perhaps in the autumn (if weather conditions are conducive to rapid plant growth), its sugar content can be very high. (Cold stress can also cause a sudden increase in sugar content during the autumn.) This high sugar content frequently poses a problem for domestic horses, especially those who are already overweight or have foundered on pasture before. It is wise to limit pasture intake during those times of the year in at-risk horses and ponies.

In contrast, lush pasture is seldom a problem for wild or feral horses. That’s because in the natural setting horses lose weight in the winter, when it is cold and there is little to eat, and they

build back up during the spring and summer months. Also, most wild mares are in late pregnancy or early lactation during the spring, so they need all the calories they can get.

Most domestic horses are not permitted to experience this natural annual cycle of weight gain and loss. I don't know for sure, but I suspect that we may be doing more harm than good by preventing horses from experiencing this natural rhythm. I'm not advocating that we stop blanketing or feeding horses extra in the winter; just that it's alright for them to lose a little weight this time of year. (In fact, the winter months can be your ally if you've been trying to get weight off your overweight horse all year without much success.)

### **The natural diet is low in fat**

The horse's natural diet is low in fat, being only around 2–3% fat. (In human terms, that's an ultra-low-fat diet!) Also, the fats in the horse's natural diet are not purified or otherwise refined, but instead they are complex biological molecules whose structure and function we barely yet understand.

Horses do not have gall bladders, so their bodies are not well designed for fatty meals. Furthermore, horses do not seem to seek out high-fat foods over other types of food. Thus, fats do not appear to be a very important part of the horse's natural diet—at least, not in terms of quantity; some fat is essential, but quality evidently takes precedence over quantity.

So, while supplementing the horse's diet with fat seems to be safer than using a high-grain diet when extra calories are needed, being heavy-handed with the dietary fat may not be a good idea either. For one thing, there is some evidence that high-fat diets can interfere with the microbial breakdown of fiber in the large intestine. As dietary fiber is the horse's primary source of energy, this effect is somewhat counterproductive.

Also, the efficient utilization of dietary fats by the working muscles appears to require an adaptation period of a few months. And even then, switching to greater reliance on fat for energy production occurs somewhat at the expense of the efficient utilization of glycogen and glucose, the two primary fuels for working muscles in horses who are required to perform activities involving power and/or speed. As a consequence, peak performance may suffer slightly in horses performing these activities (e.g. jumping or galloping, vs. endurance exercise at low speed).

And finally, there is a limit to the amount of fat one can get a horse to eat. Although most horses eventually get used to the addition of a cup or two of vegetable oil to their feed, for example, there comes a point at which the horse will refuse the feed if you continue to add more oil. Perhaps it's simply a palatability issue (flavor and texture), but it may also be telling us something about the body's wisdom in choosing what is good for it.

### **Whole food, live food, and lots of variety**

The horse's natural diet consists of whole foods, live plant material, and a great diversity of plant species. In addition to grass, a horse in a natural setting eats the leaves, stems, flowers, seeds or fruit, bark, and roots of a wide variety of nongrass herbage. This aspect of the natural diet could take up an entire article, so I'll simply state that, as in humans, variety and freshness of phytonutrients (i.e. plant-source nutrients) is *essential* for good health.

While horses can certainly survive on hay alone, they do not *thrive* on this preserved diet, even with supplemental vitamins and minerals. Some of the phytonutrients in living plant material are very sensitive to the hay curing process. For example, the levels of vitamin E and omega-3 fatty

acids, and probably several other antioxidants, are very low in grass hay compared with the levels found in that same grass when it is fresh.

My preference for resolving this problem is to provide the horse with daily access to native or unimproved pasture, woodlands, or other natural areas where a variety of nongrass herbage may be found, even if it means hand-grazing the horse among the “weeds.” Another option is to offer the horse fresh or dried herbs, of the type and variety commonly found in native pastures. (Hilton Herbs produces some wonderful nutritional supplements based on this premise. Their products can be ordered in the US from [www.ChamisaRidge.com](http://www.ChamisaRidge.com).) It can also be of value to feed a supplement that is rich in antioxidants, such as Platinum Performance Equine ([www.platinumcare.com](http://www.platinumcare.com)), which is based on stabilized flax, a rich source of omega-3 fatty acids.

In summary, the best approach to feeding horses that I’ve found for optimizing health, performance, and longevity is this: keep as close as you can to the horse’s natural diet, while meeting the horse’s individual needs for work, pregnancy/lactation, growth, or recovery.

.....  
Copyright ©2006 Christine King BVSc, MACVSc, MVetClinStud

This article was first published in the February 2006 issue of Northwest Horse Source ([www.nwhorsesource.com](http://www.nwhorsesource.com)).