



NUTRIFAX

Nutrition News and Information Update

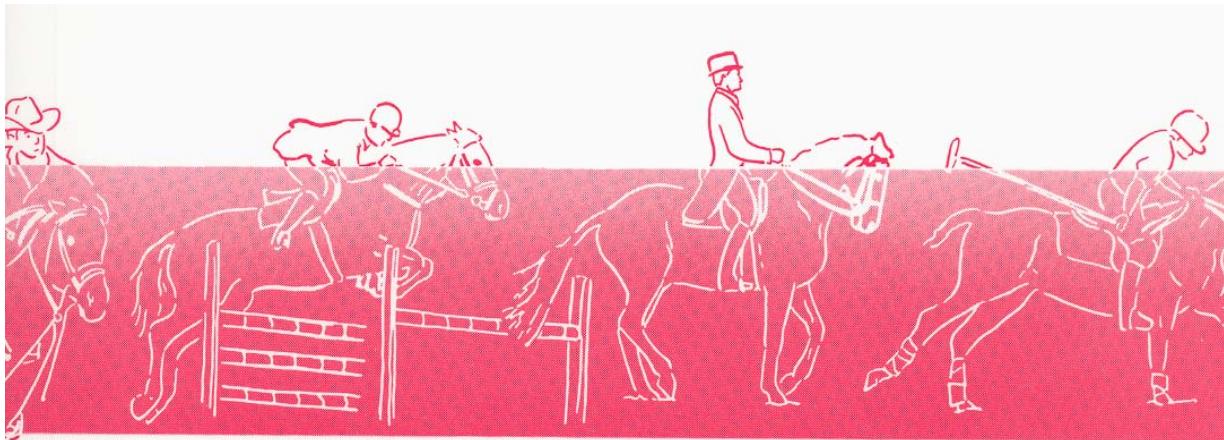


Nutritional Considerations

for the
Horse with

Chronic Obstructive Pulmonary Disease **(COPD - Heaves)**

Amy E. Halls, Monogastric Nutritionist
Shur-Gain, Nutreco Canada Inc.



Nutritional Considerations for the Horse with Chronic Obstructive Pulmonary Disease (COPD - Heaves)

Amy E. Halls, Monogastric Nutritionist
Shur-Gain, Nutreco Canada Inc.

What is it?

Chronic Obstructive Pulmonary Disease (COPD), commonly known as Heaves or the Stabling Disease, is a respiratory inflammatory disease of the airway caused by some type of allergen. It results in the obstruction of the small airways of the lung, excess mucous production and thickening of the gas exchange membrane (alveoli) in the lungs. The disease may occur following an infectious respiratory disease, such as pneumonia, Equine Influenza, or Rhinopneumonitis (Equine Herpes Virus). Horses 6 years of age and older are mainly affected. The occurrence of COPD is 8-10 % of all horses worldwide. If the disease is caught early a horse may remain perfectly healthy. However, if it is left untreated, the condition will get worse with age and exposure to the allergen, leading to significant and often irreversible reduction in lung capacity. Horses with this stage of COPD are unusable. Respiratory diseases are second to musculoskeletal problems as the cause of loss of performance.

There is still a debate on the actual cause of COPD, but most cases are due to a hypersensitivity or allergic reaction to a stimulus, such as dust. Molds are thought to be the primary cause of hypersensitivity, particularly *Aspergillus fumigatus* and *Micropolyspora faeni*, both common molds found in hay. Keeping horses indoors where they are exposed to higher levels of dust can cause the development of heaves. According to Dr. N. Edward Robinson of Michigan State University, there could also be a genetic component involved with COPD. Dr. Robinson has been involved in several challenge studies where normal (non-COPD) and COPD horses were exposed to environmental conditions that could cause the development of COPD. He has never succeeded in converting a normal horse into a COPD horse in these studies.

Symptoms

Ninety percent of horses develop a cough as the first symptom of heaves. Coughing is usually seen at the beginning of exercise or when the horse is eating or exposed to dusty environments. The disease may progress to a chronic cough and increased effort of exhaling. The normal respiratory rate of 8-12 breaths/minute may increase to 24-36 breaths/minute in an effort to obtain more oxygen. Airway constriction and alveoli thickening limit the respiratory gas exchange and trap air in the lungs, causing the lungs to remain over-inflated at the end of exhalation (emphysema). As a result, the horse's athletic performance ability is affected. By the time a horse has developed a runny nose, the disease has progressed to a serious condition and requires medical attention. The horse cannot swallow excess mucous and it is being produced at such a high rate that it begins to drain out of the nostrils.

Horses at the chronic COPD stage develop a “heave-line” (Figure 1) due to abdominal breathing. As lung elasticity and exhalation becomes more difficult the horse will use its abdominal muscles to force air out of its lungs, which causes the build-up of the abdominal wall muscles. Horses with Chronic COPD will also be intolerant of exercise, may have weight loss and refuse to eat or drink.

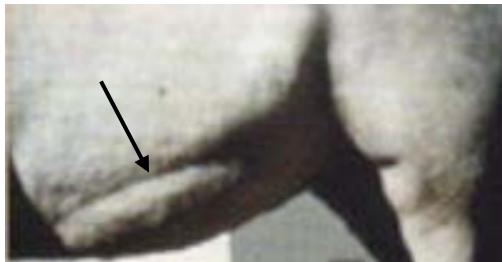


Figure 1. Characteristic heave line in a chronic COPD case due to increased abdominal breathing (Lewis, 1996).

In severe cases horses are extremely stressed and concentrate on every breath they take. Their heart rate and respiratory rate also increase. They have flaring nostrils due to the increase in breathing effort and exhibit pronounced abdominal effort associated with every breath. A horse exhibiting these symptoms should be seen by a veterinarian immediately.

Once the allergy develops it will remain for the rest of the horse's life. If the horse is removed from contact with the causative agent, the lung function will return to normal. However, the lung function of chronically ill horses may be permanently impaired. Repeated exposure to the allergen or cause of the disease will result in more rapid and severe effects.

Diagnosis

In the past a stethoscope was used to listen to lung sounds in a suspected heaves case. If whistling or wheezing sounds were heard they indicated that there was an obstruction of the small airways, which increased the resistance to airflow thus making exhaling more difficult. Today several Universities provide lung function tests that measure the total respiratory resistance of the lungs. Other diagnoses involve respiratory challenge tests and accessing the lower airway to observe the amount of mucous and to collect a sample for analysis.

Management Strategies

An immediate change in the affected horse's environment that minimizes the exposure to the causative agent is vital for treatment and prevention. Treating mildly affected horses and keeping them outdoors with an available shelter can reduce allergens to dust particles to less than 10%. If a horse must be stabled (due to injury, lack of outdoor shelter, etc.) keep it in a well ventilated stall with the top of the outside door or window left open for

air movement. Clean stalls daily and ensure all horses are removed from the stable during and for several hours after stalls have been cleaned, bedded and hay is handled. Watering the aisles in the barn, especially prior to sweeping will also keep the dust level down. Avoid the use of a blower to clear aisles when a horse is indoors and the barn doors are closed. If possible, hay and bedding should be stored in a separate building from the affected horse. For management procedures to be effective you must use them for all horses sharing the air space with COPD affected horses.

Bedding is another source of dust and mold spores in the stable. Straw tends to have the highest level of dust (Table 1). If an affected horse is currently bedded on straw, try switching to shavings or peat moss, shredded paper or cardboard. Bedding should be dust and mold free, absorbent and easy to use and dispose of. Keep stable windows and doors open in the winter to allow good airflow through the barn. This practice can significantly reduce the risk and number of horses affected with COPD. If your nose is irritated or your breathing is congested, then your horse will be as well.

Table 1. Dust levels in common bedding materials (Lewis, 1996).

Bedding Material	Air Contamination (Dust) Particles	
	Released/min	/cu cm of air
Straw	1490 - 28,100	167 - 724
Shavings	148 - 873	6 - 104
Shredded Paper	78	25 - 100
Peat Moss	low when clean	

Grass pollen can also be associated with heaves, which can develop and worsen when an affected horse is put on pasture. Horses allergic to grass pollens should be kept off pasture during pollen production, which occurs during late spring, summer and fall. Keeping affected horses on a dry lot away from pasture will help reduce COPD symptoms. Health conditions also improve during the winter months.

If COPD affected horses are removed from the cause, the majority of them will become symptom-free within one to two weeks. Horses with severe cases may take longer to recover. A longer period of time is required to reduce the level of inflammatory secretions and to improve exercise and performance ability. Remember, the most effective treatment is to minimize the horse's contact with irritating substances.

Nutritional Strategies

Hay is the main source of dust in the horse's environment. Feeding hay and bedding with straw creates three times more dust in the stall than using shavings and feeding hay cubes. The combination of hay and straw also increases the amount of dust in a horse's breathing zone 30 times. Grass hay tends to be less dusty and moldy than alfalfa hay.

To reduce the amount of dust and mold hay should be soaked in water for 30 minutes before feeding it to COPD horses. Soaking it for longer than 30 minutes may cause the loss of water-soluble nutrients. Always use clean, fresh water for each soaking. All wet feed not consumed should be replaced frequently to prevent the possible consumption of mold.

Hay should always be fed on the ground and never in a hay net or feeder. Forcing the horse to feed on hay with its head up rather than in a natural down position prevents the airway from ridding itself of mucous and dust, and creates the perfect environment for bacterial infection. Apply this rule to trailers as well. The combination of poor ventilation and using hay nets can increase the dust load in the trailer, causing airway irritation.

Large bales and bale feeders used outdoors can also expose horses to unnecessary dust. The first six inches of the outside of a bale is loaded with a lot of dust. Horses tend to stick their noses into the big bales where there is little or no ventilation, which causes them to inhale the dust. Exposure to poor environmental conditions, such as rain and snow, reduce the quality of the hay, making ideal growing conditions for mold. Ensure your hay is properly stored under some type of shelter and it is not in direct contact with the ground.

Horses with serious COPD symptoms may need to be fed a hay replacement in order to reduce their exposure to dust. Hay pellets or cubes contain low levels of dust and are good hay replacement products to feed to respiratory distressed horses (Figures 2 & 3). These products can be fed to horses at 1.0 – 1.5% body weight. Shur-Gain's **Equiline Complete Hay Cube Ration** (Appendix A) is to be fed as the sole ration to horses as a hay replacement product. This product is ideal for horses suffering from respiratory illnesses. The hay cubes contains balanced levels of added vitamins, minerals and yeast to provide optimal nutrition required in the horse's diet.



Figure 2. Hay cubes (left) and pellets (right).

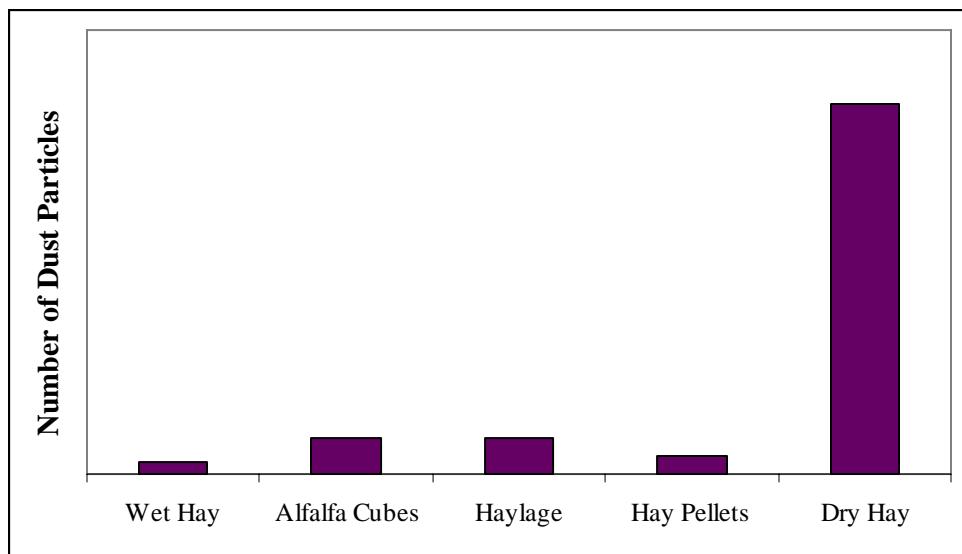


Figure 3. Dust particles associated with five forage products during feeding (Clarke & Raymond, 2003).

Feeding a complete feed pellet is another option. **Equiline Pelleted All-In-One Ration** (Appendix A) is a complete feed, incorporated with a high roughage level from dehydrated alfalfa (20% fibre) and provides a consistent level of balanced nutrients, vitamins and minerals. It is an ideal ration that can replace hay in the diet of horses with respiratory problems.

Avoid powdered supplements and straight grains in the diet of the COPD-prone horse. If they cannot be avoided, adding up to 10% fat or oil (corn oil, soy oil, etc.) in the diet may reduce the amount of dust, increase the caloric density and decrease dietary bulk. It also provides dietary energy in a form which when metabolized produces the least amount of carbon dioxide for respiratory expiration, which means less air for the horse to exhale. However, added oil should be gradually introduced over a period of two weeks to prevent any digestive upsets. Feeding sweet feeds instead of straight grains to reduce dust exposure is also an option. Shur-Gain provides three types of horse sweet feed: **Equiline 13% Horse Sweet Feed, Equiline 16% Horse Sweet Feed and 12% Sweet Feed for Horses** (Appendix A). The molasses content in the rations keep the dust level to a minimum and is also makes the feed highly palatable. The nutritionally balanced sweet feeds are a great option for those who prefer to give sweet feed rations to their horses.

Haylage is another alternative hay source for COPD prone horses. It has a good nutritional value and is virtually free of dust. Horses must be gradually switched to haylage to prevent or reduce gastrointestinal upsets. A horse ration or supplement may need to be fed in addition to provide any lacking vitamins, minerals and calories. An equine nutritionist should be consulted prior to making any dietary changes involving haylage. Haylage tends to mold very quickly when exposed to air and thus all opened bags should be used within a few days. Discard any damaged bags as well as those that smell of ammonia or contain dirt. Caution should be made when choosing to feed haylage due to the possibility of horses developing botulism, a neurological disease. During the raking and baling process, haylage can become contaminated with

Clostridium botulinum, the bacterium that produces the toxins responsible for botulism. Clinical symptoms include muscle weakness, reduced muscle tone of the tail, eyelid and tongue, difficulty swallowing, drooling, unable to stand and eventually respiratory paralysis, resulting in death. There is a vaccine available in Canada to protect against the type B botulism, the more common toxin. However, it is often difficult to treat affected horses, and thus extra care should be taken to ensure haylage is free from *C. botulinum*.

References:

1. Clarke, A. & S. Raymond. 2003. Preventing and Managing Respiratory Disease. Equine Research Centre, Guelph, Ontario.
2. Lewis, L. 1996. Feeding and Care of the Horse. 2nd Ed. Lippincott Williams & Williams, Media, Philadelphia.
3. Wright, Bob. 2001. Haylage and Treated Hay for Horses. Veterinary Scientist, Equine and Alternative Livestock, Ontario Ministry of Agriculture, Food and Rural Affairs.