Winter Wonderland: Caring for Horses when the Temperatures Fall
Nicole Tavel, DVM student (Class of 2006)

Although the warm, cozy fire is crackling inside, the bone chilling winds and snow drifts are raging outside. When winter temperatures fall, horses need special care to stay warm and healthy. Outdoor winter housing is an acceptable means of providing shelter from the cold during the winter months. Horses are well adapted to cold temperatures due to their ability to grow long, thick hair coats, and the presence of large muscle masses covering much of their body. Horses also use metabolic energy derived from food digestion for body temperature regulation. By considering the following recommendations, horses can comfortably tolerate harsh winter conditions with no detriment to their health or body condition.

1. Feed – If all temperatures drop below 20° F a horse will not require additional calories to meet maintenance requirements. Old and young horses tend to lose body condition over the winter. Although it is tempting to supplement these animals with a high concentrate diet of grains and oats, this practice should be avoided. Horses, whether in good or poor condition, need moderate to high quality grass or alfalfa hay to produce heat and maintain body temperature. They do not call them hay burners for nothing! The metabolic process of digesting forages produces “waste heat” which can be utilized by the animal for increasing, and maintaining core body temperature. It is essential to provide a source of forage that can be consumed throughout the day. The net energy requirement in cold (<14° F) conditions can be up to 5%-50% greater than that required in the warmer months. Forage amount should be increased as the temperature decreases with continual observation of body condition. Excessive weight gain should be avoided and can easily be masked by winter coat. Supplementation with grain or vitamins/mineral mixes to maintain a balanced diet is acceptable. If animals lose condition, oils (e.g., 2-4 ounces corn oil) can be added to the diet to provide calories without the risk of digestive problems associated with consumption of large quantities of grain.

Winter Tips
- Provide good quality forage for health and warmth, not additional grain
- Warm water can help increase intake during cold months and prevent gastrointestinal difficulties
- Indoor, heated housing creates poor ventilation and respiratory problems
- Remove shoes if possible to prevent slipping on ice and hard snow build up in the hoof
- Always ensure a horse is dry after exercise prior to returning him to pasture on cold days
- Ensure horses have free access to salt and minerals

(continued on page 3)
A horse’s leg is positioned in front of the hospital’s new gamma camera during bone scanning.

Many variables play a role in getting a mare pregnant and maintaining the pregnancy. Two factors that make a pregnancy successful are reproductive performance and sound management. Although we cannot control a mare’s reproductive deficiency, we can control improper management. One management issue that the horse owner can control is the role of nutrition in the pregnant mare. When feeding broodmares we must keep in mind that not only must we meet the nutritional needs of the mare, but we must also meet the nutritional needs of the foal. Therefore, the needs of the mare change depending on the stage of reproduction.

In order to have a successful conception, the mare must be healthy and in good body condition. Research has shown that fertility is optimal in mares with a body condition score of 5-6 out of 9. This means that the ribs are not visually discernible but easily felt; the back is flat or may have a slight crease; fat can be felt around the tailhead; withers appear rounded; and fat may be deposited behind the shoulders and along the sides of the neck. A mare with an adequate body condition score is reproducively efficient with decreased foaling problems, rebreeds more efficiently, applies stored energy for reproduction and lactation while able to lose weight, and utilizes less feed during lactation which reduces the risk of colic and founder. Thin mares compared to mares in adequate body condition are more likely to abort, and require high levels of concentrate to gain weight during both late pregnancy and lactation. Fat mares have decreased fertility and therefore have poorer conception rates than mares in good body condition.

The nutrient requirements of an open mare and a mare in the first eight months of pregnancy are identical. This is because the unborn foal is growing at a rate of about 0.2 pounds per day during the early pregnancy, which is slow enough that the mare does not have any extra nutritional requirements. The diet should consist of good quality pasture or hay, supplemented with salt and a small quantity of a vitamin-mineral premix. If high-quality roughage is not available, concentrate feeds may be fed in combination with roughage to maintain the horse’s body condition.

Pasture is a vital need for the mare during the last trimester of pregnancy. A mare’s condition and body weight need to be closely monitored because this is when 60-65% of the fetal growth occurs. Therefore, the mare’s energy, protein, mineral, and vitamin requirements increase. During this time, the energy requirements increase 20% above maintenance values and the protein requirements increase 32% above maintenance values. At the same time, the rapid growth of the foal restricts the digestive capacity of the mare. In fact, the foal’s growth rate increases to about one pound per day during this period. Rations need to be changed from an early pregnancy diet of 88-90% forage to 70% forage and 30% concentrate diet by foaling. Remember that mares should also be removed from fungus-infected pasture hay and pasture during these last ninety days due to severe complications that can occur such as abortion, thrombosis, and prolonged pregnancy. In addition, the pregnant mare needs fat-soluble vitamins A, D, and E. Good sources of these vitamins include commercially prepared feed, supplements, and vitamin-mineral premixes.

Furthermore, the mare’s calcium requirement increases by 85% and the phosphorus by 100% during the last trimester. Adequate levels of both of these minerals are crucial as the calcium: phosphorus ratio should be kept between 1.5:1 and 3:1. Developmental bone problems can start in utero; therefore, failure to meet the calcium and phosphorus demands during this time will reduce the growing fetus’s bone strength and integrity. Developmental bone problems can start in utero; therefore, failure to meet the calcium and phosphorus demands during this time will reduce the growing fetus’s bone strength and integrity. A ration based on mixed forage (hay or pasture) containing up to 50% legumes (alfalfa, clover) is preferable to maintain the correct calcium: phosphorus ratio. Other minerals that should be closely monitored include copper, zinc, manganese, and iron. These trace minerals are essential for proper bone maturation and growth, are stored in large quantities by the developing fetus during the last trimester of pregnancy, and are present in low quantities in mare’s milk.

Ensuring that the diet is adequate to meet the changing requirements of the mare in function of her reproductive status is crucial to any solid broodmare management program.

Nutritional Management of the Pregnant Mare

Ashley Armstrong, DVM Student (Class of 2006)

Throughout the last trimester of pregnancy, a mare’s condition and body weight need to be closely monitored because this is when 60-65% of the fetal growth occurs. Therefore, the mare’s energy, protein, mineral, and vitamin requirements increase. During this time, the energy requirements increase 20% above maintenance values and the protein requirements increase 32% above maintenance values. At the same time, the rapid growth of the foal restricts the digestive capacity of the mare. In fact, the foal’s growth rate increases to about one pound per day during this period. Rations need to be changed from an early pregnancy diet of 88-90% forage to 70% forage and 30% concentrate diet by foaling. Remember that mares should also be removed from fungus-infected pasture hay and pasture during these last ninety days due to severe complications that can occur such as abortion, thrombosis, and prolonged pregnancy. In addition, the pregnant mare needs fat-soluble vitamins A, D, and E. Good sources of these vitamins include commercially prepared feed, supplements, and vitamin-mineral premixes.

Furthermore, the mare’s calcium requirement increases by 85% and the phosphorus by 100% during the last trimester. Adequate levels of both of these minerals are crucial as the calcium: phosphorus ratio should be kept between 1.5:1 and 3:1. Developmental bone problems can start in utero; therefore, failure to meet the calcium and phosphorus demands during this time will reduce the growing fetus’s bone strength and integrity. A ration based on mixed forage (hay or pasture) containing up to 50% legumes (alfalfa, clover) is preferable to maintain the correct calcium: phosphorus ratio. Other minerals that should be closely monitored include copper, zinc, manganese, and iron. These trace minerals are essential for proper bone maturation and growth, are stored in large quantities by the developing fetus during the last trimester of pregnancy, and are present in low quantities in mare’s milk.

Ensuring that the diet is adequate to meet the changing requirements of the mare in function of her reproductive status is crucial to any solid broodmare management program.
Equine Dentistry: Benefits Both Your Horse and Pocketbook

Will Farmer, DVM student (Class of 2006)

Many horse owners are aware that horses periodically need their teeth “floated,” but few understand why floating is recommended and the positive impact that it can have both on the health of the horse and saving money in the long run. The term “float” is a lay term for razing or filing down teeth. Horse’s teeth continue to erupt throughout their life, this is unlike human teeth. This type of tooth is called a hypsodont tooth. Wild horses, which are natural grazers, ingest small particles of dirt and grit that wear down their teeth as they graze. In today’s world most of our equine companions are on a mixed ration of hay, pasture, and grain/pellets. A domesticated horse’s time spent in the pasture grazing is greatly reduced compared to their wild counterparts. With a less abrasive diet, the horse’s teeth continue to grow and form sharp points that can cause pain and discomfort. Horses may show subtle to obvious signs of dental disease. Common signs of dental disease include but are not limited to:

- Balling of hay and spitting it out, also called “quidding”
- Grain falling out of the mouth while eating
- Loss of body condition
- Large or undetected feed particles in the feces
- Foul odor from the mouth
- Poor performance, such as resisting the bit and bucking

The adult horse, when fully mature, will have a total of 36-42 teeth depending on sex. Mares tend not to have canine teeth, whereas the adult male/gelding does. This includes six incisors, two canines, six pre molars, and six molars on both the mandible and maxilla (lower and upper arcades respectively). In addition, the wolf teeth are commonly present in front of the first cheek teeth in the upper arcade but are rare seen in the lower arcade. Due to the normal anatomical relationship of the mandible and maxilla along with the pattern of chewing, mandibular teeth tend to form sharp points on the inside of the teeth (lingual surface) and the maxillary teeth form sharp points on the outside of the teeth (buccal surface). These sharp points then cause ulceration to the cheeks and tongue, causing great discomfort. During the float, these sharp enamel points are ground down to help provide a smooth level grinding surface to chew on. The traditional hand float may be adequate at removing sharp points from the cheek teeth, however, if severe dental abnormalities are seen it may be recommended that a power float be done. Power floating utilizes mechanically powered rasps that make the floating process much quicker and allows for more precise dental work.

To perform a thorough dental exam, adequate sedation is necessary along with the use of a speculum to examine the back of the mouth. During an exam the veterinarian is looking for abnormalities that are common to the horse’s age. As horses mature their teeth go through different stages as well. Permanent teeth begin to erupt at age 2½ but it is not until 5 years of age that all permanent teeth are in. As permanent teeth erupt the baby (deciduous) teeth may remain attached to the permanent tooth, this is a retained cap and should be removed. As horses grow older they may lose teeth, which can cause the opposing teeth to be excessively long and cause discomfort. Other common dental abnormalities include: malalignment or poor apposition of teeth, teeth root absorbs, periodontal disease, and overgrown canine teeth. All of these dental disorders require appropriate dental care.

An annual dental exam should be part of your horse’s health-care plan. If caught early, many dental problems can be corrected. With proper maintenance many problems can be prevented all together. It is important to keep your horse’s mouth in a healthy condition in order for them to break down food particles in their entirety, which will lead to increased nutrition and decreased wasting of feed. An equine dental exam aids in keeping your horse in better health while benefiting your pocketbook!

References:

Winter Care (continued from cover)

2. Shelter – A horse can tolerate temperatures as low as -20° F with a full winter coat combined with adequate shelter from the wind and precipitation. A horse without shelter will only be able to tolerate temperatures as low as 18° F. Horses can adapt by grouping together, turning their tails to the wind, and running in the pasture to produce additional body heat if necessary.

3. Blankets – The question of whether or not to blanket is an age old one. A horse in good flesh with an adequate hair coat does not “need” to be blanketed. A horse that is either clipped or maintained in short hair coat undoubtedly needs to be blanketed during cold temperatures. Once the decision is made to blanket, it must be strictly adhered to for the entire season. A horse left without a blanket can become chilled and much more susceptible to cold stress and disease. Additionally, a wet horse or one that is not checked daily can quickly become chilled or develop blanket sores. It is always prudent to remember blankets must be tailored for daily climate changes and different weights will be necessary as spring arrives. Basically, if a short coat is not absolutely necessary over the winter, allow your horse to grow his natural winter hair.

4. Exercise – Winter riding can be very relaxing and enjoyable for both rider and horse. Always make sure the horse is completely dry after the ride and before he is subjected to cold and windy conditions. Consider using a quarter sheet as protection on especially cold days. Remember, long periods of walking before and after exercise will help to warm up the muscles, generate heat for the horse (and you), and keep his muscles in shape. Muscle is an excellent insulator for the equine and provides protection from the cold in addition to an overall healthy body condition.
**Rhodococcus equi** is a major cause of illness and death in foals between one and six months of age. The primary disease seen with *R. equi* is pneumonia, but other disease syndromes such as diarrhea, peritonitis (inflammation of the abdominal cavity), superficial abscesses, infected joints, and bony inflammation may occur. This article will discuss the effect of *R. equi* on the lungs.

*R. equi* is a bacteria found in the soil. In the infected foal, the bacteria lives within cells and is therefore hard to attack with drugs. Some farms have a very infective strain and most of their foals get sick, but many farms only have sporadic cases of *R. equi* in their foals. Some farm-related risk factors do exist, such as large acreage, a large mare and foal population, a high foal density, and a continuously shifting mare and foal population. Also, *R. equi* grows better in dry conditions. Managerial factors can also have an effect, and one study suggested that keeping the foals stalled during the early weeks of life may be protective. While foals may not become ill from *R. equi* until one to four months of age, they are usually infected by three or four weeks. Therefore, preventing their exposure to pastures where the bacteria are present could decrease their risk of infection.

Foals are particularly susceptible to *R. equi* weakened immunity during the period when antibodies from the mare decrease and their own antibodies have not fully developed. The foal pneumonia is inhaled and enters cells in the lungs where it is able to evade host defenses. Abscesses develop in the lung and lead to pneumonia. The foals will have an increased rate of breathing and thick, white to yellow-green nasal discharge. They usually also have a fever and may show signs of illness in other body systems (diarrhea, swollen joints). The onset of disease is acute and, if not diagnosed and treated rapidly, can be fatal.

Diagnosing *R. equi* is a challenge for veterinarians. Ideally, if the disease could be discovered before clinical signs manifest, the foal could be treated to prevent illness. Although several different tests have been evaluated for detecting *R. equi* infection in foals, none have been consistent in diagnosing infection. At this time, there is no reliable way to test for infection, and the foal must show signs of disease before a diagnosis can be made.

The standard for diagnosing *R. equi* pneumonia in a foal is through clinical signs, radiographic changes and by collecting tracheal secretions in a sterile manner (tracheal wash). The fluid is viewed under the microscope to identify *R. equi* organisms in the cells. Some fluid is also cultured to establish a definitive diagnosis.

Once a diagnosis is established, treatment should be instituted immediately. The treatment of choice is erythromycin with or without rifampin. These drugs can penetrate cells and are able to kill the *R. equi* organism in the cells. Treatment should be continued until no sign of disease is seen radiographically, which may take as long as six to eight weeks. As with any drugs, erythromycin has potential side effects, including increased temperature, diarrhea, colic and worsened respiratory disease. Mares may also develop diarrhea if they ingest drug residue from their sick foal’s feed. For this reason it is not advised to administer the drugs as a means to prevent disease before a diagnosis has been established. Newer drugs such as azithromycin and clarithromycin appear safer and more efficacious however, they are also more expensive. Currently, no vaccine is available against *R. equi*, however, studies are being conducted to develop an effective and safe vaccine in the future.

Preventative measures include isolation of sick foals because they shed the more virulent form of the bacteria in their feces and avoiding overcrowded pastures to prevent spread and build-up of infection on the ground. Administration of hyperimmune plasma against *R. equi* to foals from farms that are regularly affected is cost-effective. Recommendations include: 1 liter to foals at the age of 1 month and on severely affected farms, another liter may be given within the first week after birth.

The prognosis for recovery from *R. equi* pneumonia is good only if the disease is detected early and treated effectively. While some advances have been made in recent years, until an effective screening method is found or a vaccine is developed, prevention and early detection will remain the cornerstones to overcoming this troubling disease of foals.

**Table 1**

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>How much time has elapsed since the injury?</td>
<td>Is the wound fresh?</td>
</tr>
<tr>
<td>Is the wound bleeding heavily?</td>
<td>If the wound is not fresh, is the wound infected?</td>
</tr>
<tr>
<td>Is any other structure involved that the owner can tell?</td>
<td>Is any other structure involved that the owner can tell?</td>
</tr>
<tr>
<td>Will the horse move willingly?</td>
<td>Will the horse move willingly?</td>
</tr>
<tr>
<td>Has the horse been vaccinated?</td>
<td>Has the horse been vaccinated for tetanus?</td>
</tr>
</tbody>
</table>

Traumatic injuries to the skin are common in the horse, given the nature of the animal and its environment. Wounds are caused by blunt or sharp trauma and are classified as abrasions, lacerations, incisions, or stab and puncture wounds. In horses, lacerations are the most common wound. Early intervention is the key principle in minimizing the existing and subsequent bacterial contamination of the wound and efforts should be made to promptly provide coverage of the wound. The owner is an integral part of the team when providing the earliest care possible in these emergency situations.

First and foremost, if there is any suspicion that the horse needs professional medical care, the veterinarian should be contacted immediately. The function of the owner dealing with traumatic injuries in their horses is to provide accurate information to the veterinarian who will be responding and to provide first aid to the horse. Questions the veterinarian deem important and may ask the owner in these cases are included in Table 1. It is important to be accurate in answering how much time has elapsed since the injury because this will determine if the wound is a candidate for primary closure (sutting). The “golden period” of 6–12 hours has been considered to be the time during which primary closure can be accomplished with little risk of infection, provided there is enough intact skin, not too much tension and minimal wound contamination.

The goals of first aid for traumatic wounds include preventing further injury, stopping blood loss, and minimizing contamination. If the horse will not willingly move, the owner/handler should wait for the veterinarian to arrive. If the horse is willing to move, the horse needs to be moved to a clean safe place. In cases where there is not seven hemorrhage the wound can be irrigated with saline or water and a bandage should be applied. This will prevent further contamination.

In cases of severe hemorrhage the owner should attempt to apply direct pressure to the site with saline-soaked gauze for 10-15 minutes. If the hemorrhage is not controlled effectively a pressure bandage needs to be applied consisting of a sterile wound gel covered with a nonadherent dressing followed by a conforming gauze (kling). The pressure is applied with an adhesive elastic tape over the conforming gauze. For limb immobilization, a cotton wrap should be applied over the dressing with another layer of conforming gauze followed by an adhesive elastic tape or vetwrap. A pressure bandage should not be left on the horse for an extended period of time due to the potential complications of extrems skin or tendon injury. The bandage should be removed within 1-2 hours of application, however, more than likely the veterinarian will have arrived by that time and can remove the bandage.

In order to achieve the goals of early wound management the veterinarian becomes reliant on the owner to provide accurate information and successfully perform first aid. If the owner does not have bandage material and/or does not know how to wrap bandages please ask your veterinarian to leave you an emergency bandage kit and give a quick lesson on bandaging a horses leg. The veterinarian and the owner must work as a team in order to successfully manage these types of injuries.