

CHANGING LEADS

UP-TO-DATE INFORMATION FOR DELAWARE HORSE LOVERS

INSIDE THIS ISSUE:**STRANGLES IN HORSES 3****YOUR HORSE AND WINTER AIR 4****WINTER WATER FOR HORSES 5****UD GRAD HELPED BARBARO RECUPERATE 6****RECEIVE NEWSLETTER 7****INTRODUCTION BY DAVID L. MARSHALL**

The horse gallop and its more restrained version, the canter or lope, are basically the four and three best gaits respectively. A diagonal or transverse gallop best describes the footfall pattern typical of horses versus the lateral or rotary gallop typical of rabbits or the cheetah. As a cantering horse proceeds to contact the ground following the flight or suspension phase where no foot is in contact with the ground, it uses one of the following lead-leg foot fall patterns: A right foreleg lead-leg pattern is left hind, right hind-left fore, then right fore. A left foreleg lead foot fall pattern conversely is right hind on the ground first, followed by left hind-right fore together, and left fore last to strike the ground and leave the ground.

As a horse leans or turns to the right, it normally leads with its right foreleg, and if motion is leftward so also is the lead on the left. Lead changes can occur by switching the footfall pattern of the forelegs subsequent to the hind contacting the ground or more commonly during the suspension phase of the stride by placing the other hind leg down first. Riders often

school their horses to change leads upon command. When free to choose, horses change leads in the canter, lope, or gallop when alternately changing direction, perhaps to avoid limb interference or maintain stability; they also may change leads to reduce fatigue. For example, a thoroughbred coming down the home stretch may change leads ten or more times as the lead leg (the power or push off leg) fatigues more rapidly than the non-lead leg.

I hope you enjoyed the above lead-leg and changing leads description from George Waring's book, *Horse Behavior*. All of us who have spent any amount of time around horses know through experience that horses at the canter "take a lead". All of us know through 'riding feel' that horses will "change their lead" and some of us know within our mind's knowledge core the lead leg principles and use this core knowledge to school our horses to "take a lead" or "change their lead" upon our command.

*(Continued on page 2)***WINTER VENTILATION BY GARRETT L. VAN WICKLEN**

A common misconception of many horse owners is that a barn must be tightly closed during winter weather to maintain a comfortable, warm and healthy environment. Nothing is further from the truth!

A horse is an animal that is continuously consuming oxygen and emitting carbon

dioxide, moisture (vapor from breathing) and liquid through urine and feces. Imagine a tightly closed barn as a plastic bag. It doesn't let much oxygen in and very little carbon dioxide, moisture or ammonia out! Over time the environment within the barn becomes unhealthy.

Horses require contami-

nated air to be replaced by fresh air.

A winter question we now need to answer is: if fresh, "cold" winter air is allowed to enter a horse barn, won't horses feel as cold -- as humans would? The answer is no; because horses can withstand low air tempera-

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INTRODUCTION

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The purpose of this University of Delaware Cooperative Extension "Changing Leads" equine newsletter is to provide the horse owning and horse loving public of Delaware and surrounding states with a science-based publication that gives insight to our regional equine issues. Our goal is to equip you with the necessary tools for developing practical management applications from the foundation of dependable, research knowledge. The complexity and enormity of the problems we must solve and manage requires a deep level of learning and integration of knowledge, understanding, and action. Our publication name, "Changing Leads" captures the ever-changing set-point of science.

We also intend to utilize "Changing Leads" as a format for highlighting some University of Delaware students and their equine-related accomplishments. For example, the strangles article in this issue was written by Whitney Christian, a UD sophomore from Elkton, Md., majoring in animal science. We also will keep you abreast of UD and Extension equine related events and programming.

Regular contributors will be myself and Susan Truehart Garey. Susan is UD Cooperative Extension's livestock specialist, based in Kent County. Susan, who

is a horse owner and UD graduate, will focus on practical horse management issues. My articles will focus on equine medical issues. My office is at the Newark campus where I am an assistant professor in the Animal and Food Sciences Department and Delaware Extension's equine veterinarian.

We will additionally feature articles from our university's expert pool to complement each issue's focus. This first copy has a winter management focus; therefore we asked Dr. Gary VanWicklen, UD Extension engineering specialist, to help us understand more fully construction concepts as they relate to proper stable ventilation. Dr. VanWicklen contributed the barn ventilation article.

Our goal is for you to grow in the understanding and application of science, specifically as science relates to the horse and horse management. If you are not currently on our mailing list and would like to be included, please fill out and return the enclosed mailer. "Changing Leads" also will be available on UD's Cooperative Extension website.

WINTER VENTILATION

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tures and still remain healthy and comfortable. The key to horses handling low air temperatures is to keep them dry and shielded from wind. Wet animals exposed to wind lose an extraordinary amount of heat.

An example of this protection principle is commonly seen on dairy farms located in cold weather climates. Some large farms use calf nurseries designed and constructed to promote calf health using an enclosed, heated, fan-ventilated barn. These nurseries house several calves together under one roof. Even with such protection from outdoor weather,

having several calves together increases contaminants and enhances disease transfer.

In contrast to enclosed barns, calf hutches are individual pens for calves that provide protection from wind and rain on all sides except for the opening and allow the calf entry into a small outdoor pen. Calf hutches produce healthier calves than nursery buildings because calves are protected from wind and moisture, but not placed together in an environment with contaminated air.

Most horse barns provide protection from wind,

rain and snow. To ensure a supply of fresh air, a continuous opening at the eaves (top of barn side wall) of approximately 3 to 4 inches should be used, even in cold weather. The eave opening can be covered by ½ to 1 inch wire mesh to keep birds from entering the barn. Smaller wire mesh will become clogged over time with dust and debris and actually limit fresh air from entering the barn.

The air entering through the eave opening will be heated by animal body heat and rise to the top of the barn. A 6 to 8 inch ridge opening will let this air leave the barn. There are several clever ridge vent designs

that let air out of the barn and at the same time limit rain and snow from entering.

Apply the lessons learned from calf hutches to a horse barn. Don't close the barn up so tightly that contaminants are not diluted by fresh air. Low air temperature is not harmful if the horse has protection from wind and moisture. A well-ventilated horse barn will produce a healthy comfortable environment even during cold winter weather.

STRANGLES IN HORSES BY WHITNEY CHRISTIAN

Strangles is an infection that has been documented in horses for hundreds of years. There are descriptions of it that date back to the twelfth century and earlier. Strangles is contagious, spreads very rapidly, and is currently a worldwide problem (Pavord 197). This highly contagious disease continues to be widespread in Delaware's horse population. The incidence of strangles peaks each year during the winter stabling season.

Strangles is a suppurative [pus producing] inflammation of the lymph nodes of the head and neck in horses of all ages, sexes, breeds, and disciplines (Higgins 76). Strangles infection is caused by the bacteria, *streptococcus equi* (Kahn 1212). Strangles is an acute upper respiratory and throat infection that has the potential to become severe if not treated correctly (Giffin 66). It has a high morbidity but generally a low mortality rate with appropriate treatment (Kahn 1212). Strangles is found in horses of all ages, but is most common and most severe in young horses, that is horses less than two or three years of age, (Higgins 76).

Strangles is transmitted in a variety of ways from horse to horse. Transmission of strangles can be through direct contact, aerosol, oral, fomites [an object like a brush, halter, bit, clothing, that can transmit an infection], and the environment. Direct contact with pus and nasal discharges can effectively spread strangles from horse to horse (Pavord 197). Strangles also can be transmitted through flies (Higgins 78). *Streptococcus equi* can survive for weeks in water troughs, feed, and pastures, making it very difficult to rid an environment of the strangles bacteria (Hadden 350).

Strangles has an incubation period of three to 14 days with the first sign being a fever. The fever can range from 103-106°F, but is usually at 103°F (Kahn 1212). Typical signs of strangles

are exhibited in the 24-48 hours after the initial onset of fever. These signs include mucoid to mucopurulent [pus generally white in color] discharge, depression, and submandibular swelling [under the chin between the two lower jaw bones] of the lymph nodes. Often the retropharyngeal lymph nodes [glands deep in the throat] will be affected as well, which can cause difficulty swallowing, noise while breathing due to compression of the throat, and an extended head and neck posture (Kahn 1212).

Some other signs of strangles may include loss of appetite, bad breath, moist and intermittent cough, inflammation of the lymph nodes of the soft palate and tonsillar areas, and lymphostasis [clogging] of the affected lymph nodes (Higgins 77).

Three ways to help prevent the spread of strangles are: providing and maintaining quality air, biosecurity, and vaccination. It is advised that horses which are new to a population should be isolated for three weeks and screened for *streptococcus equi* by weekly nasopharyngeal swabs, [throat cultures]. We now frequently recognize a population of horses that are asymptomatic carriers of strangles; that is, horses that carry the strangles bacteria but they are not sick. Frequently these are horses previously sick with strangles, recovered, but continue for months and months to carry the bacteria. These horses then become continual reservoirs of infection for our susceptible horses.

Horse owners must always concern themselves with strict hygiene to avoid indirect transmission between the resident population of horses and new horse(s); so-called biosecurity measures (Sweeney 130). Lastly, housing horses in areas, barns, and stalls where stale air is continuously being replaced with fresh, non-contaminated air has a

profound effect in maintaining respiratory health in susceptible horses.

Dr. Whitlock at New Bolton Center has said: "A solution to pollution is dilution". In other words, horses contaminated with strangles bacteria breathe out their exhaled breath; this breath is carrying high numbers of the infective bacteria. If that contaminated exhaled breath is immediately diluted with fresh air and then immediately removed from the stable through ventilation openings, the next horse to breathe in will get a lung full of fresh clean air verses a lung full of bacteria laden air.

Lastly, there are two types of vaccinations currently available to help prevent a strangles infection. The traditional, intramuscular injection vaccinations are effective in preventing strangles, but it takes about two weeks for the horse to develop immunity to *streptococcus equi*. The newer, attenuated live intranasal vaccine [squirted into the nose] appears to be the most effective vaccine for preventing strangles. It should be given to healthy animals that have no nasal discharges. Annual boosters are recommended with both vaccine types for continued immunity (Sweeney 127). Your equine veterinarian can assist in determining if your horse requires strangles vaccination, which vaccine is best for your horse, and additionally assist you in establishing a preventive vaccination program to maintain peak health for your horse.

Strangles is a highly contagious disease which continues to threaten our Delaware horses; but through careful preventive measures, managing air quality, and treatment if necessary, the effects and spread of *streptococcus equi* can be lessened.

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YOUR HORSE AND WINTER AIR BY DAVID L. MARSHALL, V.M.D.

Air quality is one of the most important factors for maintaining horse health. Confining your horse in a barn during winter places it at a heightened risk for respiratory problems. Recurrent airway obstruction (heaves) is the most common respiratory disease in horses confined indoors and forced to breathe poor quality air.

The condition has been termed chronic obstructive pulmonary disease (COPD), chronic pulmonary disease, chronic airway reactivity, hyperactive airway disease, broken wind and hay sickness. Although veterinarians prefer the descriptive disease name "recurrent airway obstruction"; for simplicity, I'll use the well recognized name heaves. Despite an improved understanding of the many causes of heaves and the availability of effective drugs for its therapy, management and prevention; heaves in our Delaware horse population continues to be a major health risk.

Although there has been an attempt through the years to improve stable air quality, environmental improvements are often incompletely carried out so that horses are subjected to either continual or intermittently high levels of poor air quality irritant challenge. Veterinarians now recognize stable air hygiene (clean stable air) as the central factor to both preventing and managing heaves in horses.

First, a little refresher on heaves. The condition occurs worldwide, but the highest prevalence is in the United States in Northeastern and Midwestern horses that are fed hay and stabled. Heaves affects middle-aged to older horses with the median age impacted around 12 years. Although this is a disease of middle-aged to older horses, the life-long breathing of poor quality air is a major factor in these mature horses getting heaves. Horses with heaves may have a chronic cough and an accentuated forced effort to exhale (breathe out). Air is drawn in easily, but the horse has trouble pushing it out. Forcing it out requires two movements of the abdominal wall. This can result in an enlarged abdominal muscle of expiration, the so-called heave line. Horses with heaves also can have a clear or infected (mucopurulent) nasal discharge. Decreased speed and endurance may be the only early sign of reduced performance. As heaves progresses, the horse will cough, develop the double expiration rhythm and will be highly susceptible to respiratory tract infections and pneumonia. Once heaves is diagnosed, the horse will always be susceptible to

recurrences of the disease.

Husbandry excellence aimed at providing our horses clean, fresh air is the benchmark of prevention and treatment against heaves. The two greatest winter-time air pollutants to our horses are ammonia and organic dusts or molds commonly found in cured hay and straw.

Ammonia is the cause of that burning sensation that you get in your nostrils, throat, and down into your lungs when you're mucking out stalls. Most horse owners accept the stench as a normal part of a horse stable. Although ammonia is a normal breakdown product of horse urine, if you can smell it in your stalls, be assured it is burning and permanently damaging the delicate tissues of your horse's respiratory tract.

Organic dust from hays is a normal consequence of the hay-making process. Mold spores do occur normally [generally in small numbers] in all hays, as well as develop in greater numbers in the normal hay drying process. These spores can be greatly and dangerously elevated in poorly cured hay. Although it is always our goal to purchase and feed our horses dust-free hay, we must also recognize that organic dust is a normal product of the hay-making process.

Where do we go from here? We know our horses are going to produce urine, and many of us in this area must feed our horses hay and bed our horses inside on straw during the winter period. The answer is management practices that provide clean air for our horses. Keeping horses outside in clean paddocks or pastures with protective run-in sheds is one answer. However, if you plan to stable your horses inside this winter, managing air quality for your horses becomes essential. Warm, closed barns compound the ammonia problem as heat promotes ammonia production. Tight barns don't allow ammonia fumes and organic dust from hays to escape. Good ventilation which includes openings to the outside for fresh air to enter and opening to permit stale air to exit are necessary.

We tend to build and maintain our barns from a human comfort and aesthetics point of view rather than from the horse's life-long health point of view. Small steps in improving the air your horses breathe this winter may have a great influence on your horse's life-long respiratory health.

WINTER WATER FOR HORSES BY SUSAN TRUEHART GAREY.

As horse owners and caretakers we tend to think more about the quantity and quality of water that our horses consume in the summer rather than the winter. However, water consumption is just as critical to our horse's health in the winter.

A horse's body is composed largely of water; the body of an adult horse is approximately 70% water and the foal's is 75-80%. Proper hydration is essential to the horse's function. Among the most important considerations for adequate water consumption in our horses is water's role to keep the horse's digestive tract moving and functioning properly. Adequate winter-water intake can dramatically reduce the risk of impaction colic.

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WINTER WATER FOR HORSES

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We can help our horses maintain adequate hydration in the winter by providing them with plenty of clean fresh water that is the proper temperature. Research was done at the University of Pennsylvania to demonstrate the effects of water temperature on water consumption in horses. This research demonstrated that during cold weather if horses are offered only warm water to drink they will consume more water than if they were offered only cold water. Interestingly, researchers discovered that if horses were offered both cold water and warm water at the same time horses would choose the cold water.

Heated buckets and stock tank heaters are good options to keep water temperature warm in the winter and encourage your horses to drink. For those that have 3 to 5 horses, they are certainly less expensive than the cost of one vet call to treat impaction colic. Remember that stock tank heaters should be plugged into a GFCI protected outlet to prevent your horse from potentially getting shocked.

Generally speaking, the plug type stock tank heaters are safer than the floating style, especially in a plastic tank. If, like me, you have a horse that likes to paw in its water tank even in the dead of winter, you may need to fashion a plywood lid of some sort to limit access or a metal grate that sits over the plug heating element to protect it from being damaged or broken.

If tank heaters and water bucket heaters aren't an option for your management system, then consider some of the other interesting observations that resulted from the University of Pennsylvania drinking water temperature study. Researchers observed that stalled horses that were fed hay and grain tended to do most of their drinking within a few minutes of consuming their grain and then within an hour or so of being given their hay. This is pretty typical of what other drinking behavior studies have dem-

onstrated. In addition, they also observed quite a bit of hay wetting behavior where a horse would dip each mouthful of hay or drop the entire flake in before consuming it. Knowing this implies the necessity to coordinate your watering to coincide with this period of time when horses tend to consume most of their water. This way the water temperature would be warmer than if it had been sitting in the bucket or tank all day long.

The normal behavior just cited gives us an additional management clue to insure proper water intake for our horses. Horses desire to drink their daily water only one or two times per day; they are not water sippers throughout the day like many of us. Because horses drink only one or two times per day and want to drink principally after eating; it is important to make their daily maintenance amount of 8-10 gallons of water always available to the horse. This means each horse in a stall should have two 5 gallon buckets per stall. It also means a stock tank needs to be large enough to comfortably provide each horse it serves with a minimum of 10 gallons water per horse. This minimum size stock tank is related to another normal horse behavior which is: when one horse goes to drink, all the horses follow to drink. An easy way to warm up stall water buckets is to carry gallon jugs full of very hot water from your house and add it to the bucket [or tank] water, remembering to always warm both buckets as your horse will likely drink from the cold bucket given a choice. Warming stall water has an especially profound positive effect for our older horses.

Two additional hints to keep your horses healthy in winter months include providing free choice salt, and feeding a diet that is largely forage based. As a general rule of thumb, horses should take in between 1.5% and 3% of their own body weight in feed every day and the greatest component of the diet should be forages of some kind.

Winter Management Tips:

1. Make sure your horses are in adequate body condition going into the winter. It is much harder to put weight on a horse in the winter than to maintain a weight.
2. Provide plenty of good quality forage to your horse. Digesting forage takes longer and actually produces more body heat for a horse than digesting grain.
3. Provide plenty of clean, fresh and slightly warmed water to encourage maximum water consumption.
4. Provide free choice plain white salt.
5. Don't lock the barn up tight. Make sure that there is adequate ventilation so you aren't trapping ammonia and disease organisms in with your horses.
6. Keep a close watch on your horse's body condition. With heavy winter coats, a visual inspection is not enough. Make sure you run your hands over your horse to feel for ribs.
7. If you blanket your horses make sure that you remove the blankets and check their body condition regularly.
8. We tend to have mud in the winter on the Delmarva Peninsula. Mud on hair, like wet hair, robs the hair's insulative properties.
9. Additionally, keep your horses as clean and dry as possible to reduce the risk of developing scratches or rain rot.
10. Have a plan to deal with the potential of loss of electricity on your farm. There was an ice storm on Delmarva in the 1990's that knocked power out in some areas for more than a week. How would you power the pump for your well?

UD GRAD HELPED BARBARO RECUPERATE BY MARGO MCDONOUGH

Kendall Stratton, AG '04, never thought she'd be dodging news vans and teary-eyed fans when she took a job as a patient attendant at University of Pennsylvania's New Bolton Center, located in Kennett Square, Pa.

But once Kentucky Derby winner Barbaro became a patient, the quiet country roads around this renowned animal hospital became filled with journalists and curiosity seekers. Barbaro is recovering from a shattered hind leg sustained at the Preakness on May 20.

In September Stratton left the position to attend Cornell University's College of Veterinary Medicine. Up until that time, she spent her days grooming, watering and feeding Barbaro and the other horses in intensive care and neonatal intensive care. She also assisted the veterinarian nurses with routine medical procedures.

"Barbaro was a very good patient," Stratton said. "He was a little feisty, but all race horses are going to be that way."

Although world-class athletes – human or animal – generally follow strict training diets, Stratton said that Barbaro has a pronounced sweet tooth.

"He loves his treats," Stratton said. "Sugar cubes and peppermint candies are two of his favorites. He also likes carrots but he's not a real big fan of apples."

Having Barbaro as a patient added excitement to Stratton's job. But caring for equine celebrities wasn't the most meaningful aspect of her 17-month tenure at New Bolton.

"Working there really solidified my decision to go to vet school," Stratton said. "It was a pretty intensive environment. From the end of January through June is foaling season; we saw a lot of sick foals and other emergency patients coming in then."

"My first day of work was nerve-wracking," Stratton recalled. "I stood back and observed when the first few emergency patients came in that day. But it wasn't long before I jumped in and started to assist. I discovered I really enjoyed the pace of an emergency facility."

After graduating from UD in May 2004, Stratton entered a doctoral program in pharmacology at Drexel University. Her career goal at the time was to work for a veterinary pharmaceutical company.

But after one semester, Stratton began to re-consider this goal. She decided to pursue a career in veterinary medicine. At that point, however, it was too late to apply for admission to vet school. So in February 2005 Stratton began her stint at New Bolton. She had previous

experience with small animals as a technician and wanted to see what it would be like to work with large animals.

The fact that New Bolton is a premier equine facility was the icing on the cake for Stratton, who was a member of UD's Equestrian Team and has been riding since the age of 9.

"The veterinarians at New Bolton are amazing; they are so talented at what they do," Stratton said. "And they were great about helping me and providing networking opportunities."

Stratton also had high praise for her experience in UD's College of Agriculture and Natural Resources. The Barrington, R.I., native said she was drawn to the college because its small size allows faculty members to get to know students. "Immediately I felt comfortable at the college," Stratton said. "And, academically, the animal science program was excellent."

She said one of the high points of her college years was an Equine Reproduction class taught by Dr. David Marshall. "The equine class was so hands-on," Stratton recalls. "Students conduct the artificial inseminations and are there for the foalings."

Stratton's performance in the classroom and out in the field was always outstanding, according to Marshall. "It was clear Kendall possessed the mental giftedness along with the personal character to become a fine young scientist and future leader in veterinary medicine," Marshall said.



Kendall Stratton, AG'04, at the entrance to UPenn's New Bolton Center, where Kentucky Derby winner Barbaro is recuperating from multiple hind leg fractures suffered at the Preakness. Photo by Danielle Quigley

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