

Equine Ambulatory News

Fall 2008 • Volume Five - Issue One

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Photo by Doug Selby

Enthusiasm and Commitment Keep Equine Ambulatory Program Fresh

One of the most fulfilling aspects of working for the Veterinary Medical Teaching Hospital involves our constant interaction with up-and-coming veterinarians. Our students, interns and residents see veterinary medicine through new and excited eyes. They are enthusiastic and determined as they move toward their ultimate goal, whether it be private practice or academia.

This enthusiasm is contagious and energizes us all to maintain excitement for our work, both teaching and patient care. The equine ambulatory service is an elective rotation, meaning that the students we have with us are, by and large, interested in becoming equine veterinarians. Our students are looking to gain as much experience as possible and we appreciate all of our clients for supporting us in one of our main missions – training young veterinarians. Of course, patient care is our highest priority and we strive to provide the best care available for each and every animal while providing a structured learning environment for our students.

Once again, we would like to thank you all for your continued support. We look forward to seeing you in the upcoming year.



PUBLISHED
ANNUALLY BY
THE EQUINE
AMBULATORY
SECTION
OF THE
UNIVERSITY OF
MISSOURI
COLLEGE OF
VETERINARY
MEDICINE
VETERINARY
MEDICAL
TEACHING
HOSPITAL

MISSION STATEMENT

The mission of our equine ambulatory service is to provide the highest standard of medical and surgical care to our patients while training the next generation of veterinarians. We feel we are truly attaining this goal by working together as a team.

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Teaching Hospital
University of Missouri
Columbia, MO 65211

Meet the University of Missouri Equine Ambulatory Team

Dr. Alison LaCarrubba, originally from New York, graduated from the University of Missouri College of Veterinary Medicine in 2001. Alison stayed on at MU to complete an internship in equine medicine and surgery. After the internship, Alison spent a year working in an equine exclusive private practice with a special interest in reproduction. She returned to the university in July 2003. Although the majority of Alison's time is spent in the ambulatory truck, she also devotes some time to working with the medicine section in the teaching hospital. She is beginning the process of receiving certification with the American Board of Veterinary Practitioners, Equine Specialty.



Dr. Alison LaCarrubba

Dr. Dawna Voelkl was born and raised in western Pennsylvania, near Pittsburgh. Dawna graduated from Cornell University College of Veterinary Medicine in 2003, after which she spent one year at the University of Minnesota working in large-animal medicine, surgery and reproduction. She then completed a residency in large-animal clinical reproduction with an emphasis on the horse at New Bolton Center of the University of Pennsylvania. In August 2006, Dawna earned board certification in theriogenology (veterinary reproduction). Within the field of equine reproduction, Dawna has particular interest in working with breeding stallions, semen freezing and embryo transfer, and she has expanded the reproductive services offered by the Equine Ambulatory Service.



Dr. Dawna Voelkl

Our interns have a special interest in working with horses, and potentially going on to complete a residency, specializing in either equine medicine or equine surgery. Every June we welcome a new crop of interns. This year our interns include Dr. Martha Rasch, Dr. Loni Taylor and Dr. Jennifer Day.

Dr. Martha Rasch was born in Chicago, Ill., and grew up riding hunters and jumpers in St. Louis, Mo. She began to ride in three-day events while studying animal sciences at the University of Missouri. In May 2008, Martha graduated from MU's College of Veterinary Medicine. Her areas of interest include ambulatory practice and internal medicine. After completion of her internship, Martha plans to work as a private equine ambulatory practitioner.



Dr. Martha Rasch

Dr. Loni Taylor grew up in Hope, Ark., competing in local 4-H, NBHA, and Arkansas Horse Show Association shows.

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Raising Healthy Foals

An Ounce of Prevention Goes a Long Way

Expecting a foal is a time of great excitement. After waiting almost a full year for the new arrival you want to ensure that the foal receives the best care possible. There are a few things that you can do to promote the arrival of a healthy foal – this starts with taking care of the mare. Be sure that the mare has been properly vaccinated, dewormed and is receiving adequate nutrition prior to foaling. Once the foal hits the ground, there are milestones that you need to know.

The following is a list of these milestones and the time frame in which they should occur:

- Stretching and breakage of the umbilical cord one to two minutes after birth;
- Normal breathing efforts within one minute;
- Attempts to stand within 30 minutes after birth;
- Ability to stand unassisted within one to two hours;



- Nursing from the mare within one to three hours;
- Nursing multiple times each hour;
- First stool (meconium) should pass within six to 12 hours.

If any of these events do not occur within the normal time frame, there is a chance that something is wrong with the foal. Problems with foals are best addressed early and aggressively

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Interns
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Dr. Loni Taylor

After high school, Loni attended Southern Arkansas University where she was a member of the rodeo team. Loni graduated with a bachelor's degree in agriculture science from Southern Arkansas University in 2004, and her DVM from the University of Missouri in 2008. Loni's veterinary interests include reproduction, ambulatory medicine and neonatal medicine. After her internship, Loni plans to work in private equine practice.

Dr. Jennifer Day has lived all over the country, but her most recent hometown is Suffolk, Va. She completed her pre-veterinary requirements and veterinary degree at Auburn University in Alabama. Her areas of interest include equine internal medicine and emergency and critical care. After completing her internship, Jennifer plans to pursue a residency in equine internal medicine and a fellowship in emergency and critical care.



Dr. Jennifer Day

Prevention

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to ensure a positive outcome. While keeping a close eye on your new foal is critical, it is also important that you do not interrupt the mare-foal bond. It is recommended that you do not enter the stall frequently during the first few hours of life, but rather observe from a quiet location outside the stall.

It is critical that all new foals nurse within the first hour of life in order to ingest the valuable first milk. This first milk, or colostrum, is best absorbed by the foal within eight to 12 hours of birth. After 24 hours, the foal's gastrointestinal (GI) tract loses the ability to absorb the antibodies in colostrum and the window of opportunity for oral absorption of colostrum closes. Foals that have not received an adequate amount of colostrum, or those that received poor quality colostrum, are at higher risk of developing infections that can result in life-threatening problems, such as respiratory disease, diarrhea and sepsis. Sepsis occurs when bacteria enter the blood and seed to different organ systems and joints.

Colostrum contains antibodies that help the foal defend against viruses and bacteria that they come in contact with during the first few weeks of life. A blood test can be performed by your veterinarian 18 to 24 hours after birth to determine if the foal received adequate colostrum. When examining a foal that is 24 hours old or older that has not ingested enough of this valuable first milk, the only reliable way to provide immediate protection against pathogens is to administer intravenous plasma, which is rich in the needed antibodies.



Diarrhea is a common complication when a foal has not received adequate colostrum. Foal diarrhea can be caused by a multitude of sources, which are typically broken down into infectious or non-infectious.

Infectious causes of foal diarrhea include bacteria, viruses and parasites, such as rotaviruses, clostridial organisms, Salmonella, Rhodococcus equi and Actinobacillus. Non-infectious causes can be attributed to lactose intolerance, toxins, or "foal heat" diarrhea. Foal heat diarrhea refers to normal changes in the foal's GI tract and usually occurs seven to 14 days after birth, often coinciding with the mare's first post-partum heat cycle.

It is important that a veterinarian evaluate foals with diarrhea because these foals can develop life-threatening dehydration in as little as a few hours. Dehydration occurs more rapidly in foals because of their small size and immature gastrointestinal tracts.

Treatment of diarrheic foals consists of hospitalization, intravenous

fluids, gastrointestinal protectants, and antibiotics, depending upon the suspected cause of the diarrhea.

Good farm management is crucial for preventing diarrhea and other infectious diseases in foals. The following management techniques will help to minimize disease in newborns:

- Ensure that the mare receives adequate nutrition and provide a constant clean water source;
- Test foals for adequate colostrum at 24 hours of age;
- Isolate new mares and foals prior to joining the herd;
- Vaccinate pregnant mares one month prior to foaling. This will increase the quality of antibodies that the mare will produce in her colostrum;
- Harrow pastures and clean stalls to decrease parasite load;
- Deworm mares prior to foaling;
- Have a clean environment available for foaling;
- If moving your pregnant mare to a new barn prior to foaling, be sure to move her four to six weeks before she is due to foal. This will allow her time to build up antibodies to the local environment, which will then be passed to the foal in colostrum.

When you spend a year preparing for the arrival of a new foal, it is worthwhile to take measures to ensure that the foal will have the best chance at a long and healthy life.

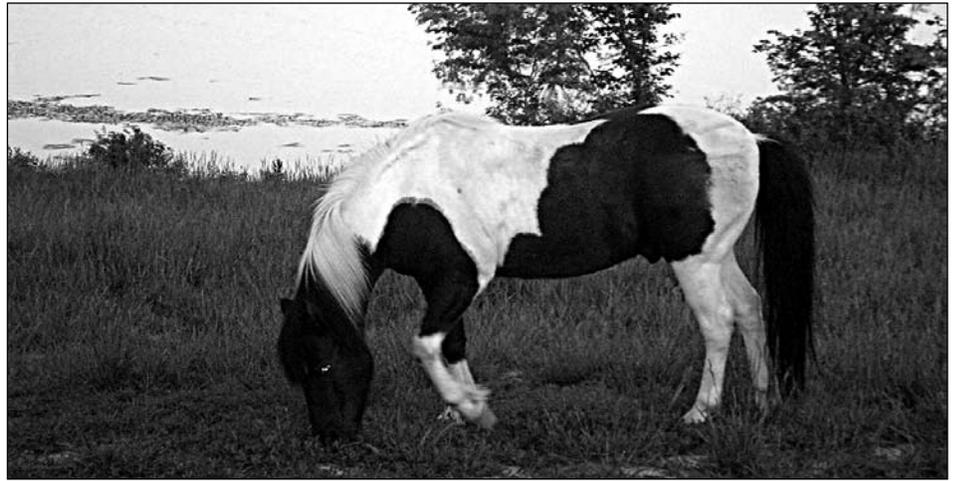
Case Study:

Eye Problems Demand Immediate Care

Thunder is a 13-year-old mixed breed pony that presented to the equine ambulatory service for an eye injury. Thunder's owner noticed that his eye was cloudy and tearing and called for an appointment immediately. Upon presentation Thunder was bright and alert, although it was obvious there was a problem with his right eye. Further examination of the eye revealed excessive tearing, diffuse opacification of the cornea (the eye looked white and cloudy), a corneal ulcer present near the medial canthus (toward the nose) and a brown spot at the center of the ulcer.

The ambulatory team was concerned that the brown spot in the center of the ulcer represented a place where the eye had ruptured. We were not sure if the brown pigment represented Thunder's iris protruding through a defect in the cornea, or if it was a foreign body. Either way we knew that this was a serious problem that needed immediate attention if the eye was going to be saved.

Thunder was referred to the Veterinary Medical Teaching Hospital for examination by the ophthalmology service within hours of the initial call. The specialists confirmed the presence of a corneal ulcer and a severe infection in the eye, along with the pigment at the center of the ulcer. They suspected a foreign body, such as a piece of wood, although this could only be confirmed at surgery. An ultrasonographic examination was performed on the eye to determine if the



retina was intact. If the retina had detached at the back of the eye, then we would be unable to preserve vision. The retina was found to be in the correct location. Although many horses and ponies go on to have a long and productive lives with only one eye, the owner elected to attempt to save the eye and preserve vision. Thunder was immediately taken to surgery.

During an hour and a half of surgery, using a microscope to visualize the cornea, a splinter was removed from Thunder's eye and a patch of tissue was sutured over the defect in the cornea. Thunder recovered uneventfully from anesthesia and was able to walk back to his stall by early evening. Although the splinter was removed, we were still unsure if Thunder would be able to overcome the severe infection. To facilitate treatment of the eye, a device called a sub-palpebral lavage tube was placed under the lower eyelid. This tube allowed all of the eye medications to be given through a long tube which coursed down the neck and was tied into the mane. The eye medications were given as fre-

quently as every two hours over the first days of treatment, so the horse really appreciated this tube. Thunder was also started on systemic antibiotics and pain medications.

At one week post surgery, Thunder still had some pain and inflammation, but the infection was under control and the surgery site was healing well. The eye continued to be treated aggressively to prevent infection and promote healing, but Thunder was home and the prognosis was good. Six weeks after surgery, Thunder's eye had healed with great use and minimal scarring.

Special thanks goes to the ophthalmology service for providing prompt and skilled service and turning a bad situation into a positive experience for client and patient.

All of us who work with horses know just how sensitive they are and just how quickly things can go wrong. We can't impress upon you enough the importance of having any problem associated with the eye examined as soon as possible.

Equine Metabolic Syndrome An Emerging Epidemic



The lifestyle of contemporary, domestic horses differs greatly from the nomadic, grazing existence in which they evolved. The same slow metabolism that once served as an evolutionary advantage for survival on poor-quality forage can lead to dangerous weight gain and glucose-toxicity when combined with modern, energy-rich feeds and limited exercise. Horses classified as “easy-keepers” appear virtually immune to even the most drastic calorie restriction. Unchecked, their seemingly unstoppable weight gain may lead to a series of potentially serious consequences and a condition referred to as equine metabolic syndrome.

Equine metabolic syndrome is triggered by excessive consumption of high-quality feeds, leading to chronic elevations in glucose levels. These horses are commonly overweight, even on very little feed. This weight gain is often not uniformly distributed, but rather focally deposited in the crest of the neck, shoulders, rump, at the tail head, and in the sheath of male horses. Additionally, affected mares can be hard to breed due to an abnormal and

unpredictable cycling pattern. And, most devastatingly, chronically afflicted horses are often diagnosed with laminitis, or founder.

The effects of equine metabolic syndrome stem from a generalized resistance to insulin, similar to type II diabetes in people. Insulin is a normal, pancreatic hormone responsible for transport of high levels of glucose out of the bloodstream for subsequent use by the body’s cells. However, a horse with equine metabolic syndrome has a decreased response to insulin, caused by fat-derived hormones and an inherently low metabolism. This insulin resistance allows toxic levels of glucose to build in the blood stream. Laminitis is often the end result of chronic insulin resistance and hyperglycemia, although the mechanism by which this occurs remains largely unknown.

Equine metabolic syndrome is typically first identified in middle-aged horses, but has been seen in horses 6-20 years old. Although seen most commonly in pony breeds, Spanish mustangs, Peruvian Pasos, Paso Finos, European Warmbloods, American Saddlebreds, and Morgan horses,

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Metabolic
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equine metabolic syndrome can affect any breed. Your veterinarian can perform the definitive test of equine metabolic syndrome – a glucose tolerance test. This test involves a series of blood draws to assess glucose and insulin levels after intravenous glucose administration.

While no specific medications exist to treat equine metabolic syndrome, several strategies can be employed to prevent or reduce the effects of the condition. Primarily, a low-carbohydrate diet should be established to reduce the intake of simple sugars. The diet should consist of mostly hay and, if necessary, non-starch alternative feeds (beet pulp), never allowing these horses access to grain or unlimited pasture.

When feeding hay to horses affected by equine metabolic syndrome, it



would be prudent to run an analysis of the NSC content. The safest hay for affected horses has, on average, less than 10 percent NSC. A way to decrease the amount of sugar in the hay is to soak hay for one to two hours prior to feeding. Be aware that soaking hay for too long can result in mold formation which would be detrimental to the horse's health.

For turn-out, affected horses should be kept on a dry-lot or in a grazing muzzle to prevent excess consumption of grass. Additionally,

increased exercise can help affected horses to ward off obesity and can even improve their insulin sensitivity.

Finally, while there is no definitive cure for laminitis, foundered horses can be carefully managed by your veterinarian and farrier through corrective shoeing, restricted turnout and pain control.

Fortunately, management of equine metabolic syndrome is possible and can significantly improve the quality of life for affected horses.

Grazing Tips for Horses with Equine Metabolic Syndrome, Laminitis

As Equine Metabolic Syndrome and insulin resistance continue to increase in significance among our horse population, it is important to learn how to better care for and feed our affected equine friends. Recently, Kathryn Watts spoke on the topic of grazing horses with Equine Metabolic Syndrome (EMS) at the

Missouri Veterinary Medical Association equine summer continuing education meeting. Watts has more than 25 years of experience in agricultural contract research and consulting. Much of what was written here has been taken from her lecture and can be found online at her Web site, www.safergrass.org.

When feeding obese horses or horses suffering from EMS and laminitis, it is important to utilize feeds that provide balanced protein and mineral content, but are low in non-structural carbohydrates (NSC). Non-structural carbohydrates consist of simple sugars, disaccharides, fructans and starch.

Much of the grass we see in Missouri is considered cool season grass. Examples of cool season grasses include fescue, brome, orchard grass, rye, and timothy. Heat and cold

Over the last three decades research on forage quality has been directed toward the production animal that aims to increase nutrient density, increase sustainability and

improve cold and drought tolerance. Only recently have we realized that perhaps the characteristics that support quality food-animal production actually may be harming our horses.

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stress, along with drought conditions will change the composition of the grass rapidly and alter its sugar levels. When night temperatures drop below 40 degrees, the plant stops growing and sugar levels rise. In effect, horses grazing pasture during the spring and fall when temperatures frequently oscillate are eating grass that varies in sugar content not only from day to day, but from day to night. This constant state of flux can be problematic for horses suffering from laminitis.

The production of sugar is directly correlated with light intensity and duration. The content of the sugars found in grass will be at its lowest between the hours of 3 to 10 a.m. when temperatures at night are above 40 degrees. Sugar levels rise when the sun comes up and peak in the mid afternoon.

Along with this, drought stress results in an accumulation of simple sugars in the grass. Grass that is just about to go to seed, or has just gone to seed has the highest content of



simple sugars throughout the seed, leaf and stem.

When trying to determine a safe and effective grazing scheme for horses affected by EMS, obesity or laminitis, it may not be practical to tear out all of your pastures and replant with native species, which are typically lower

in simple sugars and somewhat less palatable. Some practical tips to safe grazing that can be helpful to you and your horse include rotational grazing, restricted grazing, restricted grazing during times of highest stress and optimizing fertility and soil pH. Restricted grazing can be accomplished in two ways: You can put your horse in a dry lot for part of the day, or a grazing muzzle can be applied.

Horses that are at risk for laminitis should be kept off of grass altogether during the periods when the nights are below 40 degrees and the NSC levels are so variable. This period typically lasts six weeks in the spring and six weeks in the fall. Allowing horses to graze during the overnight period and pulling them off of pasture during peak NSC times can also be useful. Finally, soil should be analyzed and fertilized accordingly. Nutrient deficiencies that retard growth tend to increase the NCS concentration of grasses.

For more tips on how to safely graze horses affected by EMS or laminitis, please feel free to call and talk with one of our doctors.

Preventative Care Vaccinations and Dentistry

Remember, in addition to routine vaccinations, brood mares require a rhinopneumonitis booster during their fifth, seventh, and ninth month of gestation in order to help prevent abortions and weak foals. It is also important to administer all recommended vaccines one month prior to the mare's expected foaling date in order to increase antibody content of the mare's colostrum. If you have any questions regarding vaccinations, please call us and we can discuss a vaccination schedule that fits your horse's needs.

Quality dental care is critical to the welfare of your horse. We recommend a yearly dental examination. Our full mouth



speculum and power equipment allow us to address the common dental issues, such as sharp enamel points, as well as provide the ability to deal with more significant problems on the farm. A thorough dental examination and annual float is critical to the health and well-being of patients, and we are committed to providing that care.

New Facility Proposed to Expand Teaching, Services

Missouri has the third largest equine population in the United States and the MU College of Veterinary Medicine has a rich tradition in educating students and veterinarians in the art and science of equine practice! Educating the next generation of veterinarians is an exciting challenge for all of us.



Establishment of the Equine Teaching Center will be an important milestone in ensuring that we are able to provide the very best experiences for our students, and will serve to improve Missouri's equine herd health.

Dr. Neil C. Olson

Dean, College of Veterinary Medicine

Teaching

As the only institution in the state conferring a DVM, the College of Veterinary Medicine at the University of Missouri graduates approximately 75 students each year. Many of these students go on to careers that include a presence in equine practice. The center will offer the following:

- Space and facilities to enhance student instruction of practical clinical skills;
- Proximate housing for horses used for teaching on campus;
- Dedicated space for horse owners and veterinary extension seminars, wetlabs and workshops;
- Facilities for whole animal teaching including palpation stocks, open areas and stables;
- Adequate space for equine theriogenology teaching.



Service

The Equine Teaching Center will not only meet the need for state-of-the-art educational facilities, it will also provide improved options for equine care, treatment and services:

- Affordable horse stabling for healthy client breeding horses;
- Space to develop reproduction services, including semen collection;
- Affordable accommodations for client-owned horses with conditions necessitating prolonged convalescence.

- Accommodations for equine research projects and housing for horses on campus within easy access of diagnostic modalities available in the Veterinary Medical Teaching Hospital and Veterinary Medical Diagnostic Laboratory;
- Turn-out paddocks for exercise of teaching, research, and theriogenology horses, plus client-owned horses with conditions necessitating prolonged convalescence;
- Facilities readily serviced by VMTH staff and students, such as feeding, cleaning of stables, turn-out and night visits;
- Teaching and research horses separated from hospitalized, potentially disease-bearing animals for improved biosecurity.

Other Benefits

The Equine Teaching Center will offer additional advantages to students and horse owners:



Overcoming Breeding Issues Examination Can Expose Factors Preventing Conception



It seems like such a natural thing – horses mate, the mare conceives, and then 340 days later a foal is on the ground. Yet so many times we find ourselves at the end of the breeding season with a mare that is not pregnant. While infertility and early embryonic loss are real problems in a relatively small population of mares, many cases of perceived infertility may be addressed through simple and economic modifications in breeding management.

When planning a breeding, you should consider the reproductive soundness of both the mare and stallion. While a comprehensive breeding soundness examination on the stallion of interest is not practical in many situations, a pre-breeding semen evaluation is desirable. If the mare is to be bred to a non-local stallion using cooled, transported or frozen-thawed semen, efforts should be made to discuss the stallion's semen quality and pregnancy rates during prior seasons with the stallion's owner, manager, or veterinarian prior to committing to a breeding contract.

For a mare that enters the breeding season “barren,” i.e., the mare was bred during the previous season but failed to deliver a foal at term, a comprehensive breeding soundness exam is indicated to determine the likelihood that the mare will conceive, carry and deliver a live foal at term. The breeding soundness examination consists of visual evaluation of the mare's perineal conformation and mammary glands, examination of the ovaries and reproductive tract by transrectal ultrasonography, examination of the vagina and cervix, a uterine culture, and an endometrial biopsy.

If abnormalities are detected during this examination, additional diagnostics may be pursued to evaluate your mare for such problems as hormonal aberrations and structural abnormalities. Problems that your veterinarian might identify on your mare's breeding soundness examination include poor conformation, cervical adhesions, endometrial cysts, and ovarian abnormalities such as a granulosa cell tumor.

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If failure to conceive is a problem for your mare, the first thing to consider is the quality of heat detection. Although certain mares show heat readily there are others that will not obviously show heat unless they are presented to a stallion. If you don't have a stallion on your property to "tease" your mare, it would be best to have your veterinarian perform a transrectal ultrasound examination to assess where your mare is in her cycle. Your veterinarian can also administer medications to manipulate the mare's cycle and better plan when she will come into heat and be ready for breeding.

Another factor to consider when breeding your mare is day-to-day care. If the plane of nutrition is inadequate and the horse is in poor body condition, the mare may experience abnormalities of cyclicity, aspirate air and bacteria into the uterus, or pool urine near the cervical opening, all of which contribute to poor conception rates and early embryonic loss. Grossly overweight animals may also suffer from subfertility. Additionally, mares maintained in a stressful environment may fail to conceive or may lose an early embryo.

In older (late teenage) mares, if no significant abnormalities are noted during the breeding soundness examination and heat detection is optimal, you should consider normal age-related changes. Older mares, particularly mares that have not carried a foal, can have endometrial fibrosis, or scar tissue, present that makes it difficult for them to maintain a pregnancy. The

MARES MAINTAINED IN A STRESSFUL ENVIRONMENT MAY FAIL TO CONCEIVE OR MAY LOSE AN EARLY EMBRYO.



presence and degree of endometrial fibrosis can be assessed by obtaining a biopsy. This information may then be used to help establish the probability that the mare will be able to conceive and carry a foal to term. An endometrial cytology and culture can be taken to assess the significance of any uterine fluid your veterinarian observes during an ultrasound examination.

Other abnormalities of reproductive that older mares can demonstrate are irregular cycles, sub-optimal oocyte (egg) quality, and a predisposition to uterine infection (pyometra).

Overall, the best thing you can do when breeding your mare is to have a good relationship with your veterinarian. Consult with your veterinar-

ian during the breeding process and have your mare examined by ultrasound early, as early as 14 days and no later than 16 days, to determine pregnancy. This will enable your veterinarian to best deal with a twin pregnancy, if present. Additionally, your veterinarian can recommend nutrition and physical care, including vaccination against equine herpes virus-1 at five, seven, and nine months gestation; elimination of fescue from the mare's diet approximately two months before foaling; and routine vaccinations at approximately one month prior to foaling. Following these recommendations will increase the likelihood that you are welcoming a new addition to your farm the following season.

Please contact the
Equine Clinic at the
University of Missouri
College of Veterinary
Medicine's Veterinary
Medical Teaching
Hospital at
573/882-3513 if you
have questions about
this newsletter or equine
health.

Outbreak Spotlights Rabies Risk

An increase in the number of rabies cases has prompted the Missouri Department of Health and Senior Services to place Boone County under a rabies alert. Seven bats found in Boone County have tested positive for rabies this year, a significant increase over the past five-year period. In addition, a horse that was shown at the Missouri State Fair in Sedalia died and was subsequently confirmed as having rabies.

In 2007, a total of 38 rabid animals were detected, including 33 bats, four skunks, and one horse. Statewide to date in 2008, a total of 33 rabid animals have been detected. Missouri has averaged almost 50 rabid animals per year over the past 10 years, primarily involving bats and skunks, but also including domestic species such as cats, dogs, cattle, horses and one goat.

According to the National Association of State Public Health Veterinarians, while all livestock are susceptible to rabies, cattle and horses are the most frequently reported infected species. Livestock exposed to a rabid animal and currently vaccinated with a vaccine approved by the USDA for

that species should be revaccinated immediately and observed for 45 days. Unvaccinated livestock should be euthanized immediately. If the animal is not euthanized it should be kept under close observation for six months. Any illness in an animal under observation should be reported immediately to the local health department.

The American Association of Equine Practitioners recommends that rabies vaccination be considered a core vaccine for all equids: "Rabies is an infrequently encountered neurologic disease of equids. While the incidence of rabies in horses is low, the disease is invariably fatal and has considerable public health significance.

"Exposure occurs through the bite of an infected (rabid) animal, typically a wildlife source such as raccoon, fox, skunk or bat. Bites to horses occur most often on the muzzle, face, and lower limbs. The virus migrates via nerves to the brain where it initiates rapidly progressive, invariably fatal encephalitis."

For additional information on vaccinating equids, log onto www.aaep.org.