



Equine Piroplasmosis: An Update

by HEATHER SMITH THOMAS

Equine Piroplasmosis (EP), or babesiosis, is a blood-borne parasitic infection in horses transmitted primarily by ticks and caused by two protozoa that live in red blood cells. It affects horses, donkeys, mules and zebras. The protozoa that can cause EP are *Babesia equi* and *B. caballi*. Infected animals can be carriers of the disease agent for

long periods of time, probably for life, and thus act as a source of infection to other equines. The protozoa in the blood of an infected animal can be transmitted by competent ticks or by transfer of blood to a non-infected animal.

This disease is endemic in many regions around the world, such as the Caribbean, South and Central America, Mexico, the Middle East, Africa, Europe and Asia. At the present time it is not endemic in Canada, Australia, Japan, England, Ireland or the U.S., so efforts have been made to try to keep it out of these countries.

Horses imported into the U.S. go through quarantine and testing, to try to determine their infection status (and whether they might appear healthy but still be carriers of the disease agents that cause piroplasmosis) before allowing them to enter the country. The test method originally developed to detect infected horses, called a Complement Fixation (CF) test, was used for many years. It was one of the few tests approved for use in testing of horses who moved internationally.

Unfortunately, that test yielded false negatives, especially in chronically infected horses. The CF test is highly accurate for positives; a test-positive horse is usually infected. But a chronic carrier may not always show up positive. There is some speculation that recent treatment with corticosteroids and/or some of the treatments for piroplasmosis might affect the results of the test.

Thus some horses imported before 2005—when a newer test was implemented—may have been infected and yet were negative on the CF test. This is one of the reasons that a recently developed and validated test called the c-ELISA (Competitive Enzyme Linked ImmunoSorbent Assay) test became the official import test in August of 2005, for horses entering the U.S. This test has a high sensitivity and specificity for determining which horses are infected.



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The piroplasmosis sub-committee (U.S. Animal Health Association) has been concerned about how many seropositive horses are in the U.S. and wanted to make sure that this disease does not become endemic here. There is currently no effective way to trace and follow up on all the horses who were previously imported. The horses move around, and some have left the country. Prior to 2005, these horses entered the country legally, under the “official” CF test, but some of them may carry the causative agent of piroplasmosis.

The sub-committee proposed and organized a national survey, in which banked residual Equine Infectious Anemia serum from National Animal Health Laboratory Network (NAHLN) laboratories throughout the nation would be sent to the National Veterinary Services Laboratory (NVSL) for testing using the licensed c-ELISA kit for equine piroplasmosis. The NAHLN had residue banked serum after running the EIA (Coggin’s) tests. In 2007, two million EIA tests were performed on U.S. horses at all the various laboratories (not just the NAHLN laboratories).

For the EP testing, 35 NAHLN laboratories located in 34 states (accounting for 630,000 or about 31.5 percent of that year’s EIA tests) contributed a systematic random sampling (every third to fifth sample) for the EP tests, resulting in 15,300 serum samples for the survey. Some positive horses were found, but the survey indicated a very low prevalence—an estimate of 54 horses per 100,000 for *B. caballi* and an estimate of seven horses per 100,000 for *B. equi*. To put this in perspective, this can be compared with the current rate of EIA positives, which is about six horses out of every 100,000 horses tested annually in the U.S. The results of this study can be seen in an information sheet at http://www.aphis.usda.gov/animal_health/nahms/equine/downloads/EP_info_sheet.pdf

Current Efforts To Deal With Piroplasmosis

Josie Traub-Dargatz, DVM, MS, DACVIM, Professor of Equine Medicine at Colorado State University, says that for equine owners, trainers and others involved in our industry, the key message is that the infections detected from 2008 to the present are within three segments of the industry. “These include the horses imported to the U.S. prior to 2005 (before the import test method changed to the new test that is

more able to detect the chronic carrier state). Now some of the previously imported horses are being found to be positive when tested for movement purposes using the newer test. This became a licensed test kit which has been used for regulatory response, and for import testing in recent years,” she says.

Another segment is comprised of the horses who originated at or are still residing at a certain location in southern Texas (an index premises and surrounding area). Some horses originating from this location have been traced to other areas of the country and upon testing were found to be positive.

“It is important to note that there was no evidence of spread of the disease agent from these traced positive horses

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outside of the southern Texas location. Once they were found and tested, there was no evidence that any of their herdmates (in the new locations) became infected," says Traub-Dargatz.

"All of these positive horses are now in quarantine, or have been euthanized or are contributing to our further understanding of the disease through research projects. The positive horses who are still on the index premises are working ranch horses, and under state animal health supervision. The transmission in the southern Texas location appears to be via ticks, including a type of tick that previously was not recognized as competent in transmitting *B. equi*, but has now been discovered to be capable of transmitting this disease agent. The good news is that even though some horses have been traced from that premises to multiple other states, there has been no evidence of transmission to their herdmates," she says.

This area in southern Texas seems to be the only place tick transmission of *B. equi* appears to have occurred in recent times. "We should not become complacent, however, since environmental factors could change the distribution and competency of ticks," she says.

The third segment where EP infected horses have been detected is the racehorse population. "The infection had been detected primarily in Quarter Horses involved in racing. In those animals it doesn't appear that transmission is occurring via ticks, but via less-than-optimal hygiene practices such as using the same needles and syringes on more than one horse, or using the same needle in a multi-use vial of product. Some of the people interviewed as part of the regulatory response during a recent outbreak also admitted to taking blood from one horse and giving it to another horse in an attempt to enhance performance, a procedure called blood doping," she says.

"We don't know specifically whether the transmission was due to use of blood-contaminated equipment such as syringes, needles, dental equipment, tattoo equipment or blood-doping. Any equipment used from horse to horse that could get blood or tissue on it should be cleaned and sanitized between horses. This would include surgical instruments, dental and tattoo equipment, etc. The key thing for owners, if they are not the one directly managing the animals, is to know the practices of the people who are managing the animals," says Traub-Dargatz.

Horse owners also need to realize that an infected horse can look perfectly normal and healthy. "Some people might take more precautions if a horse looked sick, but many of these infected horses look normal," she explains.

"Horse owners should be aware that poor hygiene (such as reusing needles) can pose a risk for either piroplasmiasis or EIA transmission. These are both blood-borne diseases. Neither of them are transmitted from nose-to-nose contact or sharing a horse trailer or pen. Close proximity is only a

problem if the horses are in an area where insect vectors may be an issue for EIA, or certain competent ticks might spread piroplasmiasis. Casual contact is not a concern," she explains. Risk of spread can be reduced if you avoid use of non-tested blood donors, or unclean equipment.

"We had a panel discussion on piroplasmiasis at the AAEP meeting in early December of 2010, giving background and overview of this disease. Then Dr. Mike Short, from the State Veterinarian's office in Florida, talked about the EP outbreak in Florida in 2008. Dr. Angela Pelzel, a Western Region Epidemiologist from USDA-APHIS-Veterinary Services gave an update on the current situation, numbers of animals tested (and the number of positives from the index ranch), and the trace-out from Texas, and the number of animals detected based on movement testing that has been implemented in the past year," says Traub-Dargatz.

"Dr. Tracy Norman talked about what they are doing related to EP in Texas. They have a piroplasmiasis working group in that state and have developed plans for what to do when moving positive horses for veterinary care, or due to a need to evacuate for weather-related emergencies, while complying with the guidelines regarding the movement of these horses."

Dr. Don Knowles (USDA, ARS) talked about research with the genome of one of the EP agents. "For now he advocates using the term *Babesia equi*, but he believes that eventually the taxonomy will indicate it should be named something other than *Babesia* or *Theileria*," says Traub-Dargatz. Knowles also spoke about recent findings related to treatment of positive horses who have been enrolled in a research program. The current options, once a horse is detected as infected with either *Babesia caballi* or *B. equi* in the U.S., is that either the horse is euthanized, or managed in a life-long quarantine, or is exported from the U.S. or is enrolled into a research program.

"There are two arms in the research program. One option is that the owner can request the horse be a donation to ongoing research on EP. If the research team agrees, then the horse is donated, no strings attached, to be enrolled in a research project—and it's no longer their horse. The other option is to maintain ownership and request to have the horse enrolled in a treatment research program that was recently begun. To do that, the owner needs to make the request through their state animal health official, to get the details worked out. The horse would remain on the owner's property, quarantined. Their own veterinarian would do the treatment. This requires pre-testing and sequential testing, with the horse officially enrolled in the treatment program," she says.

"The whole concept of treatment that people sometimes have a hard time understanding is that most of the reports of treatment in the veterinary literature describe treating the clinical signs, rather than clearing the parasites from the horse. In regions where the disease is endemic, all you want to do is get the horse well, rather than remove the risk he poses to other horses (as a source of the disease agent in the

carrier state).” In the U.S., however, we want to eliminate the disease agent, and thus eliminate all transmission risk.

The challenge has been to find a test that is more user-friendly than the live animal challenge, to prove that the horse has cleared the infection. “As part of the treatment research project, blood from a treated horse is injected into a splenectomized research horse or pony to prove there has been no transmission. Dr. Knowles presented preliminary data at the AAEP (American Association of Equine Practitioners) meeting that looks promising. Some of the horses enrolled in the research treatment program from the index premises in Texas do appear to have cleared the disease agent. However,

if we get to where we need to treat larger numbers of horses and prove they have cleared the disease agent, it may not be practical to continue to have to do the blood transfer to research horses, and the tick feeding under experimental conditions. This gets very involved and expensive.”

But unlike EIA, where there is no treatment option (and the horse will never clear the infection), even though the horses infected with Babesia agents will not clear it on their own, there may be hope for future treatment. “We may have some hope to eventually eliminate the blood parasite. “This is very early, preliminary work, and there needs to be more study done on this,” says Traub-Dargatz.



To prevent the spread of Anaplasmosis, a new, sterile needle should be used when giving a horse an injection.

The Disease

Piroplasmiasis in horses can be caused by two species of protozoa (*Babesia equi* and *B. caballi*), transmitted from an infected horse to a susceptible horse via competent ticks. The protozoa that cause disease in horses are part of the same genus of protozoa that cause cattle tick fever (a totally different disease, often called Texas Fever) which the U.S. worked hard to eradicate during the early 1900's, and must keep vigilant efforts to prevent re-entrance via cattle and wildlife from Mexico.

The protozoa are present in the bloodstream of animals in the active stages of infection, but may also persist in and spend part of their life cycle in the tick vector. *B. caballi*, for instance, may persist through several generations of ticks. Contaminated needles, syringes and surgical instruments may also transmit the infection physically from an infected horse to a susceptible horse.

Incubation period in horses is 10 to 30 days for *B. caballi* and 12 to 19 days for *B. equi*. Clinical signs vary from mild to severe. In mild forms of the disease the animal may appear weak or show lack of appetite. In acute and more

severe cases, the horse suddenly becomes very ill with fever, anemia, labored breathing, sweating, lack of appetite, reluctance to move, blood in the urine, conjunctival hemorrhages, posterior weakness and edema in the legs (and sometimes on the underline of the abdomen).

Some horses may be unable to get up, and die within 24 to 48 hours after becoming sick. Colic may occur in some individuals, and fecal balls may be covered with thick mucus. Gums may be pale, or slightly jaundiced (yellow). The horse may be sick for eight to 10 days and then gradually recover. Chronic cases may survive for months. Some individuals never appear to be sick, but are carriers. They may appear normal and may even be able to continue their usual work. Infected horses may act as carriers for variable periods, up to several years, or even for life.

An owner information fact sheet (in English and Spanish) is available in hard copy from the USDA, or can be downloaded from the USDA website: http://www.aphis.usda.gov/animal_health/animal_diseases/piropalmsiosis/downloads/ep_protect_your_horses_en_sp.pdf.

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Equine Piroplasmosis In The U.S.

Equine Piroplasmosis (EP) was recognized in the south-eastern portion of the U.S. many decades ago. In 1962, a joint Veterinary Services and State of Florida control program for *B. caballi* was begun in south Florida, to try to eradicate this disease. The program included quarantine and treatment of infected animals, spray treatment (to kill ticks) for infected and exposed animals, along with movement controls to prevent spread of this disease. As a result of this diligent program, the U.S. was declared free of EP in 1988.

To reduce the risk of reintroducing this disease, all imported horses must be tested for the presence of antibodies to *B. equi* and *B. caballi* before entering the U.S. The import testing is conducted by the National Veterinary Services Laboratories. In August of 2005, the official import test was changed from the CFT to the c-ELISA test, which is more sensitive in detecting chronically infected animals.

Periodic cases in which animals were found serologically positive for EP disease agents (but without clinical signs of the disease) have been found in the U.S. Most of these infected animals have been linked to previous imports from countries where EP is endemic—animals imported prior to the test change in 2005.

Then in late 2008 and early 2009, two outbreaks of the disease occurred—in Florida and Missouri, respectively—that included horses with clinical signs due to infection with *B. equi*. The disease agent was found to have been transmitted through less than optimal hygiene practices, including re-use of the same needles on multiple horses, and blood doping among horses involved in unsanctioned racing. Regulatory actions resolved both outbreaks.

An EP outbreak in Kleberg County, Texas was detected in October of 2009, among working ranch horses/cutting horses on one ranch. Those horses, and others traced from that location have now been quarantined. Some are being treated in a research program.

States that currently have EP-positive horses under quarantine include Alabama, California, Florida, Georgia, Illinois, Indiana, Massachusetts, Mississippi, New Mexico, North Carolina, Ohio, Tennessee and Texas. Several states and racetracks have recently modified their entry requirements to include a negative EP test. Some states are requiring original copies of negative tests within 14 days, along with a Certificate of Veterinary Inspection, while for others the negative test is valid for up to 12 months. Any horse testing positive must be reported to animal health officials. 🐾

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