Kentucky Horse Mystery - 477 Aborted Fetuses and Stillborn Foals Since April 28

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Lexington, Kentucky thoroughbred mare and foal.
Photograph courtesy University of Kentucky.

Between April 28 and May 16, 2001, 477 cases of first trimester dead fetuses and third trimester stillborn foals were reported to the Livestock Disease Diagnostic Center in Lexington, Kentucky.

May 16, 2001 Lexington, Kentucky - Seventeen thousand thoroughbred mares live in the Kentucky blue grass fields around Lexington, the largest racehorse breeding area in the United States. Since the end of April 2001, pregnant mares have lost 477 fetuses and stillborn foals. Last year, only 46 aborted foals or fetuses were reported to the University of Kentucky Livestock Disease Diagnostic Center. That means something has caused a 700% increase in fetal deaths.

The phenomenon is now called Mare Reproductive Loss Syndrome. Sixteen different breeds of horses have been affected from thoroughbreds to Quarter Horses. And this week dead fetuses were also reported in some female mules.

The weather was very strange in Kentucky this year going from very cold and dry in March to record breaking warm temperatures the first two weeks of April that were interrupted by a severe freeze followed by more warm and dry weather. According to agronomy experts, the unusual heat in drought conditions caused rapid growth of grasses and a concentration of molds and fungi that live on grasses which can produce toxins that cause fetal abortions.

One well known veterinarian, Tom Riddle, D.V.M., of the Rood and Riddle Equine Hospital in Lexington, has worked for twenty-three years caring for Kentucky thoroughbred horses, was the first doctor to report an unusual number of deaths to the University of Kentucky Gluck Equine Research Center and

described for me today how it all began three weeks ago.

Interview:

Tom Riddle, D.V.M., Rood and Riddle Equine Hospital, Lexington, Kentucky: "I saw my first two cases on April 26 and I identified those when I was ultrasounding mares to determine the sex of their fetuses. And this is a procedure that is done between 60 and 70 days of gestation. I went to a farm just to fetal sex six mares and two of the six mares on rectal palpations, palpated to be pregnant. But when I ultrasounded them, the fetus was dead and the fluid appeared to be almost like a snowstorm.

Ultrasound of developing horse fetus, courtesy Univrsity of Kentucky, 2001.

WHEN YOU'VE SEEN THAT BEFORE, WHAT DOES THAT MEAN?
That's actually something we haven't seen before. It was a very unusual finding. I've seen somewhat similar cases when the fetus is decomposing and the membranes are breaking down and there is some material in the fluid. But I hadn't seen this exact thing in the past. I wasn't sure what to make of it. Finding two dead fetuses in a single day doing these fetal sexing exams was very unusual. Last year, I did about 400 fetal sexings and during the whole year I think I found only five dead fetuses out of 400. So, two in a single day was very unusual.

And then the following day on April 27, I was in another county doing more fetal sexings and two of those six had dead fetuses in them very similar in appearance. By this time, I was becoming very concerned. I talked with the farm manager, told them I had seen two cases that were comparable the previous day. I was concerned they might be related and didn't know what was going on.

The following day I found three more cases and immediately phoned the diagnostic laboratory to tell them we would be sending some fetal material in. And I called the Univ. of Kentucky Gluck Research Center to tell them I thought there was a previously unrecognized disease syndrome going on. They said they had not had any previous reports. They would make note of it and would visit the initial farm to collect data.

Veterinarian pathologist examing placenta containing dead horse fetus, courtesy University of Kentucky, 2001.

As far as I know, it's unique in the Kentucky breeding history. I'm not aware of any other situation that is comparable. Many veterinarians started ultrasounding and found many mares had either aborted or were carrying a dead fetus.

ALL HAD AN ULTRASOUND "SNOWSTORM" IN THE AMNIOTIC FLUID?
Yes, common.

HAS ANY LAB DETERMINED WHAT IT IS?
No, not to my knowledge. No significant results from that fluid.

FROM YOUR VETERINARIAN POINT OF VIEW, THE POSSIBILITY OF HIGH TEMPERATURES IN APRIL FOLLOWED BY A FROST IN A DROUGHT CONDITION THAT COULD CAUSE SOMETHING TOXIC TO ACCUMULATE IN THE GRASS AND CAUSE THIS. DO YOU HAVE ANY COMMENT ON THAT?
It certainly makes good sense to me that it could be the situation. Our weather has been very unusual. We've had extreme drought in the last 6 weeks and we did have a heavy frost in mid-April.

RIGHT AFTER VERY HOT DAYS, ISN'T THAT TRUE?
Yes. And talking with agronomists, they are telling me that conditions were ripe for a mold or fungal growth to become prevalent.

IS THE FACT THAT WHATEVER IS HAPPENING IS AFFECTING SO MANY DIFFERENT KINDS OF HORSES AND MULES DOES THAT GIVE YOU ANY INSIGHT IN ANY DIRECTION IN YOUR LONG EXPERIENCE AS A VETERINARIAN ABOUT WHAT COULD BE HAPPENING?
It certainly makes you think that it's something likely in the environment. It wouldn't be limited to a feed or a hay because there are so many management programs, so many different types of horses effected. And the one thing we have in common is the weather. And the one thing we have in common is that these horses are grazing in pastures.

IF IT IS A TOXIN OF SOME SORT, WHY ARE THE FOALS AFFECTED AND FETUSES AND NOT THE MARE MOTHERS?
My feeling on that is we know fetuses and young foals are going to be much more susceptible to toxins than adults. Adults are going to be able to deal with those, but in foals the toxin is going to be more than that young age can handle.

HAVE YOU SEEN ANY SYMPTOMS IN THE MARE THEMSELVES?
There is a syndrome that has become apparent in the last 2 or 3 weeks that is running concurrently with early abortions and late term still births with pericarditis, inflammation in the sac that contains the heart.

IN THE MARE MOTHERS?
We're seeing it in all ages. We've seen it in foals, yearlings, all the way up to mares.

WHAT WOULD CAUSE INFLAMMATION IN THE SAC AROUND THE HEART?
I'm not an internal medicine person and that's a question that is being studied very careful. We're not sure. We're not sure. Some of these mares have pneumonia changes in their lungs. But they are also developing a lot of fluid around their hearts. We are strongly suspicious that it's related to the syndrome of all the reproductive problems.

OF ALL THE ABORTED FETUSES AND FOALS.
Right.

DOES THIS MEAN THAT THESE MARES THAT HAVE CARRIED THE FETUSES AND FOALS THEMSELVES, THEIR HEALTH COULD BE

AT DANGER IN THE FUTURE?
We don't know how big the risk is, but certainly since we've seen pericarditis cases, it's possible the mare could be at risk.

HOW MANY?
In my practice, I have only seen one case of pericarditis.

BUT OTHERS HAVE BEEN SEEING THE SAME THING?
Yes, they have.

WHAT'S THE NEXT STEP FROM YOUR POINT OF VIEW TRYING TO COME UP WITH AN ANSWER?
I'm relying on the team of sciences assembled by the Gluck Center to analyze the data. A survey is being compiled to send to all the local farms to better study the epidemiology of the disease. Data is being submitted daily and analyzed. So, it's a daunting task. There is so much material to analyze. I'm having to have confidence in the researchers that they will be able to analyze the data and come up with an answer."

Perspective of Veterinarian Epidemiologist

THE VETERINARIAN EPIDEMIOLOGIST IN CHARGE OF TRYING TO FIND OUT WHAT HAS CAUSED ALL THE FETAL AND STILLBORN DEATHS IS DR. DAVID POWELL AT THE UNIVERSITY OF KENTUCKY'S GLUCK EQUINE RESEARCH CENTER.

David Powell, D.V.M., Veterinarian Epidemiologist, Gluck Equine Research Center, University of Kentucky: "I think the climatic data indicates that the conditions were conducive to a very rapid growth of pasture, coupled to the drought situation that has also developed. Whatever is in the pasture could be concentrated and this is one of the factors that is leading us to concentrate our investigations on the role of some form of pasture contamination.

IF IT WERE SOMETHING IN THE GRASS THAT THE HORSES WERE EATING THAT WAS RELATING TO SOME KIND OF METEOROLOGICAL ASPECT, WOULDN'T YOU HAVE SEEN SOMETHING LIKE THIS IN PREVIOUS YEARS?
The pattern that was seen in 1981 is very reminiscent to the pattern we are seeing at the present time, but not to the same scale. Unfortunately, in 1981 and also in 1980 when this was investigated, they were unable to come up with a satisfactory answer about what was causing the problem.

I BELIEVE IN ONE OF THE PRESS CONFERENCES THAT YOU SAID SIMILAR CASES OF ABORTED FOALS WERE ALSO HAPPENING IN ILLINOIS, OHIO AND PENNSYLVANIA?
Certainly the evidence from reports that we are reporting is that this problem is not restricted to Kentucky and is occurring in states around Kentucky, particularly to the north.

DOES THAT CONTRADICT THE HYPOTHESIS THAT THERE WAS SOME METEOROLOGICAL UNIQUENESS IN KENTUCKY TIED IN WITH THE TEMPERATURES THAT WOULD HAVE CAUSED MYCOTOXINS?
Not necessarily, because all these states are on the eastern side of the United States and are very close to Kentucky. So we feel that climatic patterns could relate to those states.

WHAT ABOUT AN INFECTIOUS AGENT?
We have done exhaustive tests to look at all the common infectious agents that have been identified previously with this type of syndrome and all those tests have come up negative.

HAVE YOU HAD ANY RESPONSE FROM ANN VENEMAN WHO IS THE AGRICULTURE SECRETARY?

Yes, we have been liaising with USDA and a number of experts in various fields will be coming to Kentucky over the next few days to help in the investigation.

HOW WILL THEY DO THAT BEYOND WHAT YOU ALL ARE DOING?
They have expertise in epidemiology to help us with a survey we are going to establish to get a better handle on risk factors on farms involved in this investigation."

Could Toxins from Molds and Fungi Be the Culprit?

THE PRESIDENT OF THE KENTUCKY VETERINARIAN MEDICAL ASSOCIATION AND THE KENTUCKY ASSOCIATION OF EQUINE PRACTITIONERS ALSO THINKS TOXINS FROM MOLDS AND FUNGI ARE THE CAUSE OF THE DEATHS. HE IS ROGER MURPHY, D.V.M., WHO DESCRIBES MEDICAL FINDINGS IN AFFECTED PLACENTAS, LUNGS AND HEARTS.

Roger Murphy, D.V.M., President, Kentucky Veterinarian Medical Association and Kentucky Association of Equine Practitioners, Lexington, Kentucky: "I would say the predominant insult is to the placental tissues themselves because they are the first line, they are extremely vascular. And dopamine that is associated with most of the toxins that have such a devastating effect on the microcapillaries of tissue would be obviously show a major effect in the microcapillaries of the placenta.

WHAT YOU ARE SAYING IS THAT WOULD CUT OFF OXYGEN TO THE DEVELOPING FETUS OR FOAL ...
Exactly.

THEY WOULD THEN DIE OF ASPHYXIATION ESSENTIALLY...
Or, the placenta gets so inflamed and lets go that they die of asphyxiation. And they are delivered early or delivered compromised when the placenta doesn't let go.

ARE DEAD.
They are compromised, unthrifty, and they are whacked because they have not been nourished. They are extremely malnourished and immuno-suppressed and subject to a lot of other outside influences when they do come live.

YOU'VE SEEN WEAK AND SICK FOALS THAT HAVE NOT DIED BEFORE BIRTH IN ADDITION TO ALL THE DEAD THIRD TRIMESTER FOALS?
Right. They are either born dead or live several hours and die. Or live several days being treated and die. Or they live at this period six or eight weeks and they are just unthrifty, but are going to make it. They just aren't going to be the most robust foals. To foals that came perfectly normal with the placenta completely compromised and are doing well. So, we've seen the whole gamut.

WHY DO YOU THINK THERE WOULD BE INFLAMMATION IN THE PERICARDIUM OF THE MARES THAT HAD DELIVERED THESE DEAD FOALS?
For the same reason that would be in the yearlings that are out grazing this grass. If the toxins are creating inflammation of the membrane, the pericardium is a thin membrane. The lungs have a thin walled membrane. The fetal tissues are multi-layered membranes and highly vascular and they secrete fluid. So if those membranes are inflamed, the natural response of the body is to bathe that area in fluids to try to reduce the inflammation.

THE FACT THAT IT'S HEART, LUNG AND THE AMNIOTIC SAC WOULD ALL THREE AREAS OF GREAT BLOOD EXCHANGE IN THE BODIES?
Right."

More Information:

Some Toxin Producers:

1) **Ergot** is metabolic byproduct of fusarium mold.

2) **Phytoestrogens** are the toxin produced by the white clover mold or fungi.

3) **Cyanide** is another toxin produced in Dutch white clover.

4) **Endophyte** = toxin produced by fescue grass in response to the fusarium mold.

Fescue is an indigenous Kentucky grass. Kentucky 31 fescue is the hybrid strain that doesn't grow tall, doesn't produce as much endophyte toxin and is known as the famous Kentucky "blue grass."

Breeds Affected by Mare Reproductive Loss Syndrome in 2001:

Thoroughbred
Standardbred
Tennessee Walking Horse
American Saddle Horse
Quarter Horse
Appalossa
Rocky Mountain Horse
Arabian
Paint
Morgan
Hanovarian
Paso Fino
Miniature
Pony
Crossbreeds, at least 3
Mule

Credits

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