Ash Fork, Arizona Horse Deaths

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February 11, 1999 Ash Fork, Arizona - Over the past six months since August 1998, thirteen horses and a mule have died in Ash Fork, Arizona. Ash Fork is a farm community about a mile above sea level west of Flagstaff in the Prescott National Forest region.

On August first, a gelding on the Susan and Harley Cox ranch became weak. Other symptoms included: tongue hanging out, sweating, having a hard time moving or standing up, eventually he went into seizures. So the Coxes had him put to sleep. Then in November, three more horses weakened, heads drooping, tongues hanging out, sweating, unable to get up and also had to be put to sleep. Their remaining four horses seemed OK. Susan told me, "We thought we were finally out of the hell hole in November."

Interviews:

1) Susan Cox, Horse Rancher, Ash Fork, Arizona: "Their symptoms were all similar, but different. Because Muffy walked around with leg tremors for like two weeks. They kept telling me she is sloughing off the toxin. So, then December comes around and it's the Tuesday before Christmas and the filly - the mare that went down that was pregnant with the leg tremors, Muffy - this was her 18-month-old foal - started trembling in the front end. And she was in the pen with a 3-year-old mare. So, we watched her and she went down, was paralyzed, couldn't move and she stayed like that that whole week until Saturday morning when my husband and his friends could get her loaded into the trailer and take her down to the Vet Diagnostics Lab down in Tucson at the university there where they of course were going to put her to sleep.

"I've lost between $25,000 to $40,000 worth of animals. I owe $2,000 in veterinary bills, diagnostic lab results and also I owe $350 to the Gilbert Equine Animal Surgical Unit there. Not only do I owe $2,000 in veterinary bills or lab tests or whatever you may call it, my loss financially. Plus I had to turn away eight breedings to my stallion which is 19 years old. He is foundation blood quarter horse. He is like a fantastic animal and to turn away eight breedings at $450 a month plus $5/day mare care, you're looking in the thousands again that I'm losing. Not only the emotional attachment. And my daughter's horse that we broke and trained and she was roping on it and everything else. I mean, the horse was only five years old."

Lab Analysis

The lab could not determine a diagnosis and tests on the hay feed and water for toxins were also negative. Five horses gone in six months. No insurance. And nothing certain about what was wrong.
Then on Christmas morning, neighboring ranchers Heidi and Larkie Baker's 17-year-old mare could not stand up or eat her food. Two days later on December 27th, their 3-year-old stud colt had the same symptoms - tight jaw muscles, couldn't chew and went to the ground unable to get up. The Bakers

knew that Sue and Harley Cox had paid for veterinarian and lab analyses on their five dead horses without a clear diagnosis of what was wrong. The Bakers also knew that at least four other horses and a mule had suffered paralysis and died.

So, they decided not to waste money and shot the mare and colt to put them out of their misery. The Bakers prayed their last surviving horse - a 4-year-old mustang mare - would stay well. But after their stud colt died December 27th, Heidi Baker knew her mare was sick, too.

2) Heidi Baker, Horse Owner, Ash Fork, Arizona: "On the 27th, I noticed that my mare named Geodi - I noticed that Geodi had a sore throat because she was not drinking. She was not eating. And when she did try to drink, she could not swallow. So I gave her a whole bunch of throat lozenges, you know, because they like candy. And she was happy. That whole day she was very lethargic, just licking at food.

Has anybody in the veterinarian community said to you, 'This is what we think has killed the horses'?

The State Vet told me straight out - he said, 'We cannot.' He looked me straight in the face and said, 'We are not able to rule out botulism, but we really do not believe it to be botulism. We believe it to be a toxin.' Those were his words to me."

Botulism C

Larkie Baker estimated that the region where the horses have been in ill in Ash Fork is only about 2 1/2 miles long and a half mile wide. A common denominator are hundreds of crows everywhere and ranchers haul water in trucks to open cisterns where chlorine tablets are added. Humans and horses and crows drink the same water. So far, water analyses have not turned up any suspicious pathogen or poison, but the U. S. Dept. Of agriculture did find something that could be the source of Botulism C. I talked to Lloyd Brown, Public Information Officer for Arizona's Dept. of Agriculture in Phoenix.

3) Lloyd Brown, Public Information Officer for Arizona's Dept. of Agriculture in Phoenix: "We were investigating the dumping of some animals nearby there.

Dead animals?

It's related to dead animals. There was an animal dumped and left in an open grave in June 1998. After that, other animals that died in that area were dumped in the same location. That area was covered the week of January 25th. So all of those - I think the final count was five for sure and maybe sixth animal, and certainly the birds and some of the local coyotes or local wildlife had been feeding on those remains.
Wouldn't they have died as well?

Birds are known to be carriers of botulism toxins and spores. So if you have birds feeding on a rotting carcass and it's a dry year and those birds are flying over the water buckets and getting a drink - so there is a little more to this investigation that also is being considered."

Arizona Dept. of Agriculture News Release About Horse Deaths

All the crows in Ash Fork could be eating exposed dead animals and their droppings ending up in the horses' water and food. On February 3 and 4, a team of USDA veterinarians and pathologists joined Arizona State veterinarians to collect bird droppings, soil, plants, and water at the Cox and Baker farms. The team also collected blood from the three remaining Cox horses to study.

Then on Friday, February 5, the Arizona Dept. of Agriculture released a news update to the media that in part stated:

> "Laboratory analysis found botulism type C spores in gut samples collected from a horse that died in November 1998. Combined with the clinical symptoms exhibited by the sick animals, the finding of spores seems to support earlier assumptions that the cause of the deaths probably is isolated to the Ash Fork area and probably is not spread by horse-to-horse contact.
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> "Meanwhile, the joint diagnostic team comprised of experts from the Arizona Department of Agriculture, the Arizona Veterinary Diagnostic Laboratory at the University of Arizona in Tucson and the U. S. Department of Agriculture, Animal Plant Health Inspection Service, Veterinary Services, concluded its initial on-site investigation Thursday, February 4.
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> "Livestock owners should contact the Arizona Dept. of Agriculture Office of the State Veterinarian at 602-542-4293 for assistance gathering samples if they believe their animal is displaying botulism-type symptoms. Botulism symptoms include muscle tremors and weakness; difficulty swallowing, the tongue may hang out; and eventual paralysis of respiratory muscles causing death within 24 to 72 hours.
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> "Steps to reduce exposure to botulism include making sure all dead animals are buried or disposed of properly since decomposing flesh is known to contribute to the formation of botulism type C toxin. Also, since birds may be involved in the dissemination of the botulism toxin, horse owners should minimize the attraction of birds to animal areas - thus, cover hay piles and grain and regularly change water and clean water containers."

The press release also pointed out there is *no* botulism Type C vaccine approved for horses.

The lab where the botulism C spores were identified in the gut tissue of Sue Cox's horse was the University of Pennsylvania School of Veterinary Medicine. There, Dr. Robert Whitlock, Assoc. Prof. of Veterinary Medicine, is considered one of the country's leading experts on botulism, especially botulism C. I asked Dr. Whitlock to describe typical symptoms:

4) Dr. Robert Whitlock, Assoc. Prof. of Veterinary Medicine, University of Pennsylvania School of Veterinary Medicine: "Typical clinical signs of botulism in adult horses are a bit variable, but are characterized essentially by muscle weakness. This can be manifested in a variety of ways.

Foals, for example, have a decreased responsiveness to nurse the mare. And or when they try to nurse the mare, the milk may fall out of the side of the lips.

Because they are not able to control the muscles in their mouth well?

Correct. And then they show evidence of laying down more than normal, but otherwise appear OK for the first few hours. They look normal, bright, alert and active and then this progressively they become progressively more tired until the point where they cannot get up or unable to nurse. And then eventually they become recumbent. Some foals, as well as adult horses, may present with initial clinical signs of abdominal pain, although this is not common but does occur. And occasionally the abdominal pain may be so severe to mimic surgical colic and require surgical intervention, but again this is fairly rare. Mostly occurs in

adult horses.

From the onset of botulism taking over a horse, what is the typical length of time they are sick before they die?

The onset of the progression of the clinical signs of botulism in horses ranges enormously, from as short as a few hours to over several days to two or three weeks and some horses may actually recover from botulism without treatment.

In the Arizona case, I think part of the confusion among the ranchers I interviewed and why they are rejecting botulism as an explanation is because in a few of the cases, the horses had been alive for some period, even for weeks with symptoms of weakness and muscle trembling, but not dying in three or four days.

Botulism as a disease is toxin-dose dependent. So it only makes sense that the more toxin the horse or any animal ingests and the more they absorb from the GI tract, the more rapid the progression of clinical signs. If it's a massive dose of toxin, horses can ingest it and be dead within 12 hours and never be seen to be abnormal by the owner. But that's extremely unusual.

Most horses do progress over periods of 3 to 5 days, gradually becoming more weak and recumbent. Most horses show some inability to eat normally or swallow normally. Then once they get down, on occasion will get up and down for a few days and it depends upon continued absorption of toxins in the gut or how much they absorbed to begin with as to whether or not they will recover or go ahead and die.

Is it true that birds can pick away at dead carcasses and take in the botulism spores to the birds and then transfer it around the countryside in their droppings if infecting horses without the birds themselves dying?

That is suspected to occur and not been proven to occur. But that is a plausible explanation. Because in this outbreak - there are different types of botulism strains, if you will, of A, B. C. D. E. F. and G and this is type C. Type C is most often associated with carrion or dead animals. And then the toxins are produced in the dead animals. The horse has access to that animal or person or whatever - but usually the dead animal. Whereas Type A or B botulism are considered to be soil contaminants - they get into the forage and the forage is not preserved correctly and the botulism spores form toxins in the forage. And Type C is probably from carrion.

This botulism Type C they found spores in the gut of one horse.

Two samples from one horse - there was pretty strong concentration, that is correct.

Did the Dept. of Agriculture in Arizona and the state veterinarian in Arizona go over each of these thirteen cases with you?

No. I have a very sketchy history by talking to other veterinarians, primarily that in the last month out there.

So you have talked with some Arizona vets?

Yes.

In terms of the description of symptoms as described to you, what has been your overall impression?

Overall impression some of them seem compatible with botulism, but some of the signs were not. And I guess what I'm wondering is it possible that all these 13 horses might not have the same problem. Some could have botulism and some not. I think it needs - each horse needs to be evaluated by itself and look at the progression of events. For example, in one or two cases that other

veterinarians talked about were dog setting and getting up and down repeatedly. Well, dog sitting position is not typical of botulism. That doesn't mean that it doesn't occur, but it's very uncommon. And if there were repeated dog sitting and repeated getting up and down over a period of 5 to 7 days, I would think that was highly unlikely to be botulism.

Does it remind you of any syndrome you are aware of?

Yes, herpes myelitis.

Herpes myelitis. How would the horses get that?

It's a virus infection among the horse population. A lot of people get herpes they get exposed to other horses that have it and other people.

Have they tested for this?

I don't know.

Is it typical of herpes myelitis or botulism C to have clusters of deaths?

Yes, very much so."

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