Grass Awn Migration Disease
with Bill Lauenroth, PhD

The following was originally released by the AKC Canine Health Foundation as a podcast. If you prefer to listen to the interview, the podcast is available here: http://www.akcchf.org/news-events/multimedia/podcasts/grass-awn-migration-disease.html

In this interview, Dr. William Lauenroth discusses his CHF-funded research which focused on "mean seeds" and the role they play in grass awn migration disease.

AKC Canine Health Foundation (CHF): Can you start off by explaining what grass awns or mean seeds are and how they can cause an infection in dogs?

Dr. William Lauenroth (Lauenroth): An awn on a grass is a short bristle on the end of the seed. They are often there to help distribute or disperse the seeds, and in some cases, they have plumes on them to help the wind carry them along. In other cases, they have barbs, and the barbs are very effective at catching on fur.

The notion of a mean seed has come about because some of these seeds with awns that have barbs also have sharp, pointed seeds. So when they come in contact with a dog, most of the time they get tangled in the hair and they end up dropping off at some point, but occasionally the sharp, pointed part of the seed gets traveling into the dog. Once that begins, because of the barbs, the seed only moves in one direction and that's forward in the direction of the point. When it starts into a dog's body, it just keeps traveling, and then every time the dog moves in some way, it gets the seed moving forward and this is the key problem with some of these seeds. This is where the name "mean seeds" came from.

Once inside the dog there's nothing to really stop the seed, so it can essentially travel at will as it is motivated by the movement of the dog. If it comes into contact with a vital organ, that's often fatal for the dog. Otherwise, it's a foreign body inside the dog bringing lots of bacteria and other things in with it and that's where the infection part comes from.

The tricky part is that while the seed is continually moving, the infection tends to be behind the seed. So, the infection is where the seed was and not where the seed is at the moment, making the seed very difficult to locate.

CHF: Why are they of particular concern to sporting and field dogs?

Lauenroth: They're only of particular concern if we assume that sporting and field dogs spend more time out in areas with un-mowed vegetation than other dogs do. I think that does tend to be a fact that hunting dogs and field trail dogs just spend a lot of time in un-mowed vegetation, and other dogs when they're outdoors tend to be in other kinds of locations.

CHF: Are there any special precautions an owner of a sporting or field dog can take to avoid an infection from a grass awn?

Lauenroth: Well, there are two. The simplest and the one that requires no technical knowledge is to thoroughly brush and comb your dog every time you get back home from being out of doors in a place with un-mowed grass vegetation. Most of the time the seeds are relatively easy to get out of the fur and in the few hours while the dog is in the field it's quite unlikely that the seed could disappear into the dog. So that's probably the best thing that an owner can do.

Second thing is to become familiar with what some of these plants look like. I think most hunters with dogs and field trail handlers know what cockleburs are and they're a terrific nuisance. So if these dog owners could recognize the few grass plants that have these dangerous seeds, they could either avoid them or take special care in grooming their dogs when they get back from the field.

CHF: The first objective of your research was to assess the frequency with which veterinarians report grass awn disease in diagnosis. How did you approach this objective and what were your findings?

Lauenroth: Before I start on that I need just preface it with sort of the motivating idea for this work: it came from field trail dog owners. They had the impression that grass awn disease had been increasing in frequency over the past 10 or 15 years.

So with this first objective, I naively thought that I could just contact veterinary hospitals and get into their database and get an idea of whether it was in fact true that the frequency of this disease had increased over the past 15 or 20 years. The problem that I ran into was the main impediment to answering that question clearly is that the diagnosis is really difficult to make; unless a veterinarian gets lucky enough to find that seed in the awn, it's not possible to make a conclusive diagnosis.

So I started looking at records and asking some of the database people at the hospitals to look at records for me. There were very few where there was a concrete diagnosis of grass awn disease and there were a large number of foreign body infection kinds of cases that had no resolution.

So I guess to summarize, I didn't find very much of use with respect to that objective.

CHF: Next, you sought to investigate the kinds of grasses being planted under the Conservation Reserve Program, or CRP, to consider whether this could be a source of injuries to sporting dogs. What is the Conservation Research Program and what were your findings?

Lauenroth: Well again, let me just go back to the motivating idea that the frequency of this disease had increased and part of the anecdotal explanation was that so has the

Conservation Reserve Program (CRP), so couldn't it be possible that an increase in acreage of the Conservation Reserve Program the more frequently dogs are using those areas could be part of the reason why the disease is increasing.

So, I didn't have a clear answer to the question of "Has it become more frequent in the past 10 or 15 years?" The Conservation Reserve Program is a federal program that was started to take marginal cropland out of production and put it back into a permanent vegetation to decrease soil erosion.

Much of this permanent vegetation that gets planted on Conservation Reserve lands is to a very large extent grasses, so that marginal cropland is turned into perennial grasslands and a wide variety of grasses are planted.

My first task was to ask, "Has the acreage of Conservation Reserve land increased over the past 10 or 15 years?" My focus area was a 10-state portion of the Midwest. What I found was that there are lots of acres of Conservation Reserve land in that area, about 11 and a 1/2 million acres, but since the program started in the late '80s, early '90s, has been almost no additional increase. Some fluctuations in some states, but the major increase was at the beginning of the program, and this acreage has held mostly steady over the time that it's been in effect.

The second part of the issue was that are there grasses that are being planted in these Conservation Reserve lands that could be dangerous to dogs. After looking at lots and lots of seed mixes, one of the things that kept popping up was the large amount of Canada wild rye that was being planted. There was a little bit of Virginia wild rye but Canada wild rye was the major potential problem plant. As I dug through these seed mixes I was just surprised at how much wild rye was planted; not only how many different kinds of locations into which it was planted, but the proportion of each seed mix that was made up by wild rye.

After doing just a small amount of additional investigation, verifying that Canada wild rye does have a sharp, pointed seed with an awn that has barbs on it, that focused me on that species as probably the most dangerous plant that is being planted in these Conservation Reserve lands in the Midwest.

CHF: In your third and final objective, you sought to characterize the importance of Canada and Virginia wild rye in undisturbed grasslands in the Midwest. What were you hoping to determine?

Lauenroth: Well, as I said, I was quite surprised at how much of the Canada wild rye was being planted. I didn't have a great depth of knowledge right at my fingertips about what those grasslands looked like before they were originally cultivated or what the remnant grasslands still look like. So I decided that I would satisfy myself and try to answer the question, "Why are they putting so much wild rye in these mixes?"

I collected data for as many undisturbed grassland sites in my 10-state area as I could, and Virginia wild rye is almost never present, a few small sites, but Canada wild rye is often commonly present but in very, very small amounts. So this verified my concern that there was so much of it being planted. If they were trying to make these Conservation Reserve lands look like the original grasslands, what then was the objective for putting so much wild rye in?

After doing a little bit of additional research, what I discovered is that wild rye seed in all of these mixes is the least expensive component, and often by a factor of 2 to 4. That's one of the issues: it's very inexpensive to produce, so it's easy to put a lot of it in these mixes. And two, it germinates and establishes very, very aggressively, so it's a way of ensuring almost whatever the conditions are during the year of planting, that the operator will get a stand of grasses.

CHF: What can the owners of sporting and field dogs who use CRP grounds look forward to in the future as a result of this work?

Lauenroth: There's an additional question—well, when I talked to the CRP managers about this question of why so much Canada wild rye, their idea was, "Well, we put it in there because, as you noticed, it's inexpensive, it's easy to establish. We always get a stand, but we're sure that it disappears in a couple of years. It never stays an important part of the grasslands, so it shouldn't be a problem."

Well, to some extent it contradicts what dog owners are seeing. The next step I would like to make in this research is to try to answer the question, how long does Canada wild rye last in these mixes?

I would go back to this 10-state region and look at a range of Conservation Reserve grasslands, and it's very easy to discover their age because the Natural Resource Conservation Service keeps good records about what and when they were planted, and try to answer, "Does Canada wild rye really disappear in just a couple years?"

With that information, the follow-up is to approach the managers of the Conservation Reserve land and start to negotiate with them about whether they really need Canada wild rye in this mix. Would it be possible to have smaller amounts or no Canada wild rye at all?

And this could have potential long-term benefits for sporting dog owners; if we could get that dangerous grass out of these conservation Reserve grasslands, it would very likely decrease the probability that they would have trouble with their dogs with grass awn disease from this particular plant.

CHF: In your opinion, is there a need for more research in this area?

Lauenroth: Yes. Understanding how long Canada wild rye lasts in these Conservation Reserve grasslands is going to be a very important issue for sporting dog owners. My hypothesis is that it lasts much longer than the managers think. While they assume that it disappears in a year or two, what I think I'm going to find is that even in 10- and 15-year-old stands of Conservation Reserve grasslands, there's going to be a substantial component of wild rye. I think that will be a key piece of information to bring forward to the people who are making the seed mixes for these grasslands and try to negotiate with them about perhaps removing this plant from their mix.

I think that this next step is going to require one more proposal and grant from the Canine Health Foundation to collect this last piece of information and then be able to go forward with a program to try to come up with a solution.

To learn more about Dr. Lauenroth's research, or to make a secure online donation, please visit www.AKCCHF.org. From our website, you can access our complete series of podcasts and sign up to receive new podcast release notifications. The AKC Canine Health Foundation is grateful to the Kenneth A. Scott Charitable Trust, a KeyBank trust, for their continued and generous support of our podcast program. Thank you!