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1. RETHINKING CWD

[This article is based on research by Rich Forrest of the Colorado-based CWD Foundation. For a series of CWD technical articles by Forrest, please visit the CWD Foundation Library at <http://www.stopcwd.org>]

Chronic Wasting Disease (CWD) is a Transmissible Spongiform Encephalopathy (TSE) disease affecting both wild and domestic deer and elk. All TSE diseases are now grouped under the term of “prion” diseases in recognition of the disease’s destructive effect upon the protective protein particles shielding nerve cells. Prion diseases are fundamentally diseases of membrane tissue, although not necessarily of neuronal tissue.

Current scientific thinking is that an abnormal prion is the causal agent of TSE and CWD. However, after two decades of intensive research, definitive proof has yet to be established.

According to Mr. Forrest, various strains of Spiroplasma bacteria produce similar symptoms and conditions generally associated with the TSE disease and its causal agents. Here are just a few of the stunning similarities:

1. *Size.* Several studies have found that brain biopsy specimens from patients with Creutzfeldt-Jakob disease revealed coiled inclusions structurally similar to Spiroplasma bacteria. Scientists have also noted that Spiroplasma can range from 50 nm to over 150 nm in width and will generally pass through the same filter widths as the suspected TSE agents.
2. *Resistance to disinfectants.* TSE agents, especially scrapie, have several unique disinfectant-resistant properties. The agent can survive: a) 5% chloroform and 2% phenol, b) 20% formalin solutions for 18 hours, and c) treatment with less aggressive protein enzymes. Spiroplasma displays considerable resistance to these normal bactericidal disinfectants as well.
3. *Resistance to heat.* TSE scrapie agent can survive in boiling water for several hours and numerous freeze-thaw cycles. In fact, a small degree of infectivity still survived after a one hour exposure to temperatures as high as 360 degrees C. Similar research has not yet been done on Spiroplasma. However, viable Spiroplasma organisms have been recovered from boiling water. Wet spores of several bacterial species have survived brief exposures between 270 to 340 degrees C, while dry spores are known to persist after exposure to 370 degrees C.
4. *Surface adherence.* Prions can tightly bind to stainless steel surfaces, and even after washing and 10% formaldehyde submersion, can transmit scrapie to recipient mice after short exposure times. Spiroplasma can survive in dried media on smooth surfaces such as plastic, glass and ceramic for over 3 weeks and survive formaldehyde disinfection.
5. *Ground contamination.* Scrapie agents can survive for over 3 years in buried soil conditions. Spiroplasma are capable of surviving up to 9 years in a liquid medium, and up to 17 years in dry and farmed soils.
6. *Hyperbaric oxygenation.* Multiple exposures of scrapie-infected mice to hyperbaric oxygenation led to aggravation of the scrapie infection. Similarly, hyperbaric oxygen aggravated Spiroplasma-induced rat brain encephalopathy.

7. *Antibiotics.* Tetracycline and its derivatives delay the onset of prion disease and can seemingly assist host immuno-reactivity against the disease. Strains of mosquito-derived Spiroplasma were highly susceptible to tetracycline and similar bacteriostat antibiotics.

8. *Vaccines.* Mice sequentially inoculated with two strains of CJD showed complete resistance to the last injected disease strain despite an anticipated more rapid incubation period. This suggests specific antibody production in response to the TSE agent. Similarly, sheep vaccinated with inactivated Spiroplasma-like bacteria resisted disease transmission. These results suggest that attenuated agent vaccines are effective and can limit or eliminate spiroplasma-mycoplasma infections.

9. *Delayed symptoms.* The detection of abnormal prions can only be done many weeks after infection. In the case of deer, prions can be detected as early as 42 days after oral inoculation. More than 12 months may be necessary before outward clinical signs appear. One can assume that the causative agent is present in the host animal from time of infection, but yet is not readily expressed in prion development.

Rats infected with Spiroplasma showed spleen infections within two days, but central nervous system affliction did not commence immediately. Fourteen days after inoculation, notable visually detectable Spiroplasma were present in the nerves. However, after 25 days, no visibly detectable Spiroplasma were found. Apparently, an intracellular stealth mode had been achieved by the bacteria.

10. *Blood.* Several studies show that it is possible to transmit TSE diseases using blood transfusions. However, the gastrointestinal tract appears to be the natural route of infection of TSEs in response to the oral exposure to the infectious agent. The favoured interpretation is that the agent spreads from the gut by lymph system to the spleen and on into the spinal cord via associated nerve cells. The early occurrence of abnormal prions in gut lymphoid tissue suggests that blood transport may be a more potent transportation method than the neural routes.

Spiroplasma and the larger group of mycoplasma are blood cell immune activators. Further, many mycoplasma species undergo antigenic variation by which they alter their surface protein structure so as to evade immune system recognition. Therefore, Spiroplasma bacteria can likely be spread throughout the body by the blood.

11. *DNA.* Spiroplasma bacteria have been directly identified using DNA tests in both CJD and scrapie brain tissue taken from divergent regional locations. This is a direct proof that Spiroplasma is in the brains of TSE diseased hosts.

If one operates under the premise that a TSE disease is classified as a prion disease, what in fact is the causative agent? Many would suggest that the prions themselves are the causative agent. However, decades of work have failed to fully or logically explain the nature of prions as it pertains to TSE. Abundant proof exists that abnormal prions are the result of TSE disease, but proofs are insufficient to assure that prions are the “cause” of TSE disease.

Upon review, one can conclude that Spiroplasma could conceivably possess the ability to infect and create disease characteristics and symptoms virtually identical to the mysterious TSE diseases.

While the capacity to produce disease is not direct evidence, certainly one cannot ignore the direct DNA presence of Spiroplasma within diseased tissue.

Based on this empirical evidence, more research should be directed at Spiroplasma bacteria as the possible cause of TSEs in general, and CWD in specific.

[If Rich's hypothesis is true, and he certainly presents a good case for it, then it increases the possibility that a vaccine can be developed for CWD, and the disease can be treated with antibiotics. Ed.]

2. INTERNET DIRECT MAIL MARKETING

The Internet offers a great way to reach customers cheaply and effectively. We are not talking about irresponsible and random spamming, but sending information out to your existing customers and/or others who have "opted-in" to your mailing list.

The goal of Internet direct mail is the same as traditional direct mail marketing – to generate leads and orders. However, on-line direct marketing requires a different approach from traditional methods.

Here are 10 tips for effective use of Internet e-mail marketing:

1. FROM and SUBJECT are very important. People are very concerned about computer viruses and are quick to delete an e-mail. The FROM line should display someone the readers will recognize and trust. For existing customers, you should use your name or your company's name.

The SUBJECT line should be treated like envelope teaser copy. You have to give the prospect a good reason to open the e-mail to see what is inside.

2. Your first paragraph or two should be a summary of your whole e-mail. On-line users have little patience in general. They need to know what you want or are offering quickly. Most people will scan the first few paragraphs only, so include all your best stuff up front.

3. Avoid using hard-sell techniques in Internet direct mail. These tend to produce poor results. Readers on the Internet expect to see information. The information can be on the benefits of your product and how to order, but the tone must remain helpful.

4. Include multiple response options for your prospects, but ALWAYS remember to have a web-based response form. Many users prefer to keep the entire transaction on-line. That way the user keeps control and does not have to worry about more sales talk or being upsold when they phone in.

5. Avoid the word FREE in the subject line. FREE is too blatantly promotional a word for people to bother opening your e-mail. The other risk is that FREE is often a word that spam filters pick up, and they will delete the message before it reaches the prospect's inbox.

6. Headlines are important. Start your e-mail with a headline that will draw your reader into the package. Try and make it different from your SUBJECT line. Your best benefit up front usually does the trick.
7. Shorter is better. If some prospects require more information, provide a link to your website where they can get it.
8. Use viral marketing. Encourage your e-mail recipient to forward your offer/message to others who may be interested.
9. On-line users prefer free trials or bill-me-later offers to money-back guarantees. While online transactions are increasing every day, many people are still wary about sending their credit card information over the Internet. They would much rather just send their shipping information, try the product for a while, and then choose their payment option when the time comes.
10. ALWAYS include an opt-out statement! The only thing more powerful than good will towards your company is ill will. Don't make any customer feel like they have been spammed. Include an un-subscribe or remove statement at the end of your e-mail. Be sure to remove them from any future mailings.

The opt-out statement should read something like this: "We at XYZ Company respect your online privacy. If you received this message in error or simply do not wish to receive further e-mails from us, please reply to this e-mail with REMOVE in the subject line."

By following these suggestions, you will make Internet direct mail an important component of your marketing program.

3. FEEDING WHITE-TAILS DURING A DROUGHT

[This article is based on a presentation by Murray Feist of Saskatchewan Agriculture at the Saskatchewan Whitetail and Mule Deer Producers Association 2003 Annual Convention, held in Saskatoon.]

The recent drought has made the business of feeding whitetail deer pretty complicated as producers look for feed alternatives and ways to control costs.

Cattle are easier to feed since they have been bred and adapted over hundreds of generations to farm production. However, deer have a digestive system that remains more closely linked to their environment. Feeding them on a farm requires a careful balance of rations.

The prairie droughts of the past few years have resulted in poor pastures and hay, as well as high-priced traditional deer feeds such as oats. According to Saskatchewan Agriculture, in the past three years alfalfa, a staple in deer production, has risen in price by 70 percent. Oats, the basis of many deer farmers' rations, is up by 127 percent.

Poor quality hay can be a problem. The deer may browse low-end alfalfa, but it will have a problem obtaining adequate nutritional value.

Oats are ideal for deer because they contain a balance of high levels of crude fibre, high fat and protein. As well, the starch in oats is segmented into pockets that delay its breakdown in the rumen, preventing sudden microbial and chemical imbalances.

Higher feed costs are also driving some pelleted feed makers to use alternative feeds. Deer producers have to check to see whether they are receiving the same feed that has worked for them all along. Changing feed for deer must be done gradually, otherwise health problems could arise.

Other choices are expensive as well. Barley and wheat prices have gone up, but these are not ideal for deer.

The unknown factor is corn. Its price is high, but lower than other feeds. The Americans have been feeding corn to deer for years and have had good results. Corn can be fed as part of a ration, but more crude fibre from another source must be used as well. Corn is low in the fibre necessary for the rumen to take advantage of the extra calories that corn contains.

Another excellent choice is peas. They have 5.5 percent crude fibre and 24 percent protein, and are excellent for deer.

When using alternative feed, producers must ensure their deer are getting enough minerals. Just because free choice minerals are available does not mean the deer are going to eat them.

Minerals are generally included in pre-mixed, pelleted feeds and supplements. When feeding whole grain alternatives, the minerals may have to be added to the grain ration using molasses or other carriers.

Supplements will stabilize feed costs at a higher price level than grain rations, but are the safest and most reliable. Until the price of feeds goes down, producers are not likely to find any cheaper alternatives.

An agrologist can usually figure out a safe ration for a herd from whatever feed producers are using.

The good news is that deer eat less than other species. You only need 3.5 pounds of feed per day for a white-tail, as compared to elk who need 14 lb., and bison who need 24 lbs. Cattle producers need 38 pounds per day of the most expensive feed in years.

4. MATERNAL PRODUCTIVITY INDEX

[As a consultant, I have worked on several projects developing “performance indicators,” mostly in the education and health sectors. I have often wondered whether similar statistical techniques could be used to develop better predictors in the cervid farming industry. This article is an example of what is being done in the cattle industry. Ed.]

Scientists at Agriculture Canada’s Lethbridge Research Centre have developed a “maternal productivity index” or MPI, for Hereford bulls. The MPI combines the factors of fertility, productive herd life, maintenance costs and genetic potential for growth into a single measure.

Until now, bull buyers have had to consider a wide range of genetic factors when looking for a Hereford bull that will produce cows with good mothering ability. When the MPI is implemented, it will reduce the guesswork and will allow fairly straightforward decision-making. For example, a bull with an MPI of 125 is better than a bull with an MPI of 115. The 125 bull is going to produce heifers that are going to stay around longer, and be better-producing females.

Until now, most measurements of genetic traits have focused on production improvement in offspring, such as growth rates and carcass quality. The complex MPI calculation incorporates weaning weight, cow weight and “stayability.”

Weaning weight provides information on calf growth and a cow’s milk production. Cow weight is an indicator of the cow’s maintenance costs. Stayability measures the probability of a cow weaning at least three calves during her lifetime.

The MPI was developed as a flexible index that can incorporate other traits over time if deemed appropriate. But according to two pilot projects, it is working fine as is.

The MPI measurements will become a standard part of genetic evaluations conducted each fall before the bull buying season. But it will be only one of the many factors a buyer has to consider when purchasing a sire. The bull still has to have four legs, pass the semen test, be interested in females and have the desired structural features.

[It would be interesting to see whether the MPI could be adapted and used for elk bulls. Ed.]

5. INDUSTRY NEWS

R.O.B.A.

The Reindeer Owners & Breeders Association Annual Meeting and Conference is being held in Pendleton, Oregon on June 20 to 22, 2003. The presentations will include the following:

- updates on CWD and West Nile virus
- slide show on the Reindeer Relocation Program in the Falklands
- reindeer nutrition – University of Alaska, Fairbanks
- training you and your reindeer to pull
- video of reindeer capture in Alaska
- reindeer health – looking for possible herd health problems.

For more information about the conference, phone: 269-375-2448 or <mailto:roba@reindeer.ws>

On the health front, R.O.B.A. reminds producers NOT to use Ivomec Pour-on on their reindeer, but rather administer an injectable wormer. The reason is that pour-on wormers have been formulated for cattle and horses, who have far shorter hair with greasier skin content. Reindeer have multiple layers of fur/hair and much drier skin beneath. This results in the protection of the wormer being greatly diminished and increases the possibility of burning the reindeer's skin.

Ban on baiting

The Saskatchewan Fair Chase League is calling on the provincial legislators to ban wildlife baiting. Such bans now exist in Manitoba, Alberta, Wyoming and Colorado. In March, the U.S. House of Representatives introduced a "Don't Feed the Bears Act" banning baiting on federal land.

The League claims that banning baiting could reduce the spread of disease and make hunting more ethical and sustainable.

Dave Brewster, manager of resource allocation with Saskatchewan Environment, called baiting a historical practice and hunting technique. He said the department bases its policies both on science and public opinion. The province is trying to achieve a balance between the needs of the outfitters and the risk of disease transmission when animals get together. Right now, Saskatchewan bans deer feeding from January to July.

Terry Kreeger of Wyoming Game and Fish Department said baiting cervids is not allowed in his state. Kreeger cited the incidence of bovine brucellosis at rates of 20 to 50 percent in elk at federal feeding stations in the state, compared to two to three percent among those roaming in the wild. He said there is good data that shows gathering animals in one place increases the probability of disease transmission.

A spokesperson for the Saskatchewan Fair Chase League said that outfitters in provinces such as British Columbia make a good living without baiting. The League would like to see hunters in the bush with professional guides capable of tracking the highly-valued trophy animals. This would create a lot of employment for guides.

6. EVENTS CALENDAR

Here is a list of upcoming events of interest to deer, elk and reindeer farmers.

REINDEER OWNER'S & BREEDER'S ASSOCIATION 2003 ANNUAL MEETING will be held in Pendleton Oregon USA on June 20-22, 2003. For more information contact Carol at mailto:roba_association@hotmail.com or visit their web site at <http://www.reindeer.ws>

NORTH AMERICAN ELK BREEDERS ASSOCIATION (NAEBA) Convention and International Antler Competition will be held July 30 – August 3, 2003 at Kansas City, Missouri USA. Contact the NAEBA office at <mailto:info@naelk.org> or visit <http://www.naelk.org> for more information.

TEXAS DEER ASSOCIATION 2003 Convention and Trade Show will be held on Aug 21 to 23, 2003. For more information, phone 210-767-8300 or visit <http://www.texasdeerassociation.com/itinerary.htm>

SECOND ANTLER SCIENCE AND PRODUCT TECHNOLOGY SYMPOSIUM will be held in February 25 to 27, 2004 in Queenstown, New Zealand. For more information contact Mark O'Connor at <mailto:mark.oconnor@nzgib.org.nz> or phone +64 4 473 4500.

***** **AD** *****

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8. CONTACT INFORMATION

We are always looking for articles and news about deer and elk farming that we can print in this newsletter. E-mail, fax or mail your ideas and articles to the Editor as per below.

For more general information, comments and suggestions, please contact:

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