

"The Silent Killer"

The livestock industry is one of the hardest for the farmer to survive in. When raising any type of animal in a production setting there are several obstacles that could get in the way. Obstacles could include finances, parasites, diseases, and lack of resources such as not enough land, feed, and fencing. Complying with the Scrapie Eradication Program costs the farmer time and money, but compliance also helps protect the farmer from unnecessary losses should an outbreak occur somewhere and be erroneously traced to him. Because of DNA testing for resistance to scrapie in sheep, farmers were able to keep resistant sheep and now it is very rare for sheep to even become infected by scrapie. The goat farmers will also be able to use DNA testing for resistance to scrapie now that resistant markers have been found. Both S146 and K122 indicate resistance and farmers can test their goats for one or both of these markers. There is no treatment for this disease and why it is such a hit to a farm that is infected. However, just a few simple biosecurity acts can help prevent the possibility from getting this awful disease on a farm.

Scrapie is described as a degenerative disease that breaks down muscle tissue and the nervous system. "The name Scrapie comes from the scraping action the animal displays as it scrapes its hair/hide off" (Gasparotto). The "silent killer" is extremely difficult to pinpoint which leads to false diagnosis of many different specie deaths. Scrapie-type disease is not just in goats, but in sheep as well as, cattle, deer and elk. It is recognized as "Mad Cow Disease" (cattle), and "Chronic Wasting Disease" (deer and elk) according to Suzanne W. Gasparotto. This disease affects the different species

differently. Once one animal is infected, the whole herd or flock is at risk of being depleted as part of the National Scrapie Eradication Program (reference is USDA/APHIS), and the farmer is without his or her animals. Most goat breeders are unaware of the disease and its history.

Scrapie was first recognized in Great Britain over two hundred and fifty years ago. It was then diagnosed in America in a flock of sheep located in Michigan in the year of 1947, according to USDA APHIS. During that time, "through July 2001, over 1600 head of sheep have been diagnosed with Scrapie. In that same timeframe, only seven cases in goats have been reported." (Gasparotto). "Only two countries are recognized by the United States as being free of scrapie: Australia and New Zealand." (Scrapie Fact Sheet). Many people do not consider goats to be in the most affected range because few cases have been reported, but in all reality goat producers weren't even aware that scrapie could infect goats also until the last few years. This is because goats had not been tested at the same level for scrapie. Other than one goat in a herd quarantined since 2005 and depopulated in 2017, no goats have tested positive for scrapie since February 2015, according to the USDA monthly scrapie report. There have been a total of eighteen cases reported in six different states. These states included Washington, which had one case; California had three cases; Colorado had three cases; Indiana had one case; Michigan came in with five cases and finally, Ohio also had five cases according to the USDA ("Scrapie Disease Information").

According to the American Goat Federation, scrapie costs producers ten to twenty million dollars in lost revenue from not being able to export goats and goat products ("Why you should care about Scrapie"). Obviously, this is a major problem to the farmer and could put them into a serious debt that many cannot afford. There are several countries that have a ban of the importation of any US goat

and sheep products, including Canada. "In order to declare the U.S. "scrapie free" and open export markets we must prove we can find sources for reported scrapie cases and have conducted testing in all sheep and goat populations" (AGF).

The way that most think scrapie is transmitted is complex and difficult to understand. However, it is thought that there are several causes for the disease to enter the farm, but there are three leading causes to be suspicious about. Scientists say the listed causes are a virus, a prion, which is ' a small proteinaceous infectious disease-causing agent that is believed to be the smallest infectious particle. A prion is neither bacterial nor fungal nor viral and contains no genetic material.' ("Medical definition of a Prion"). Lastly, a virino which is "a hypothetical infectious particle postulated as the cause of scrapie, consisting of non-coding nucleic acid in a protective coat made from host cell proteins" ("Virus"). Besides the scientific ways, scrapie is thought to enter farms by introducing new animals that are infected (but with little to no signs of the disease) into the herd in times of kidding. The infected doe is thought to pass in onto the offspring with the placental fluids according to the National Scrapie Education Initiative ("Scrapie Fact Sheet"). With that being said, it is suggested by Kaleidoscope Acres in their article, "Sheep and Goat Diseases, Scrapie, Diagnosis, and Treatment" to separate all does while kidding into an isolated space to ensure no other doe consumes the placenta of the possible infected doe. It is best to treat all does as if they were actually infected, to be on the safe side and to maybe even save a herd. Other safe precautions to ensure herd health is to always use clean, dry bedding when getting kidding spaces ready.

While looking at the ways this life-threatening illness is transmitted, the question of the clinical signs occurs. As stated before, it is difficult to really pinpoint and successfully identify the real issue

that is at hand. An infected animal may appear normal at rest, but when a loud noise or any large amount of commotion arises, "the animal may tremble or fall down in a convulsive like state" (Scrapie Fact Sheet"). The most common sign is a change in behavior and temper. The diseased goat will become extremely aggressive. Also, seeing how the nervous system is attacked while sick, it is common to see the goat having difficulty walking a straight line, standing for long periods of time and sometimes are unable to support their back end and simply collapse to the ground (Gasparotto). Other symptoms include extreme itching and rubbing against anything possible. Because of this behavior, most think they are battling external parasites such as lice or mange mites. This is also the reason for extreme hair loss and baldness. Internal parasites get the blame for the weight loss and lethargic-ness: that is the biggest battle when raising goats, so most skip the step of a fecal test and treat accordingly.

Seeing how scrapie is such a slow developing disease, it is difficult to diagnose any animal under the age of eighteen months, according to Gasparotto. Therefore, it is most commonly diagnosed in older animals. Once the animal is under full attack, they "typically live 1 to 6 months after the onset of clinical signs, but some will die earlier or later." (USDA). Scrapie is treacherous to a farm that is infected simply due to how contagious it is. Nine times out of ten, if one animal in a herd has it, the entire herd is at risk also. The reason it is such a mystery is because the only testing for the presence of scrapie is taking samples of brain matter. Obviously, the animal has to be dead already to conduct these tests. However, tests are already available for establishing resistance to scrapie in live sheep by doing DNA tests. According to Bill Northey, Secretary of Agriculture at the Iowa Department of Agriculture and Land Stewardship, "Research has already been on goats **to** try to determine which codons might provide resistance to scrapie. So far, it has been found that where sheep have three codons that can vary located in the portion of the gene that determines scrapie resistance, goats have twelve, and we do not yet know what role these may play." With the recent identification of the two codons that show

resistance in goats, perhaps a vaccine can be developed. That could easily become the most important vaccine to arise and could save farmers and producers thousands of dollars. In the meantime, according to the AGF “DNA testing services for S146 and K222 alleles are now available for goat producers to use to rid their farms of goats that could become infected with scrapie” (Stephen N White PhD – David A. Schneider DVM, PhD, DACVIN (LAIM)). Even though the disease is not common, it could possibly only take one infected animal to cause an epidemic for scrapie to wipe out several herds and flocks. Another method of testing for scrapie is to take tissue matter from the third eyelid can to test (Kaleidoscope Acres). The only problem with this method is it can be extremely expensive, difficult to get the tissue and quite extensive if treating an entire herd or flock depending on the size. Therefore, if a vaccine existed, the farmer could include this vaccine in with the other necessary vaccines to ensure herd health.

Once a farm has an infected animal, the disease is in the ground because of the fecal and urine and possible blood loss. Once in the ground it can remain there for seven to ten years. With that being said, it important to keep all living spaces clean and fresh. It is recommended anyways to keep it clean, but that is just another way to prevent the spread of said diseases. If dealing with artificial insemination or embryo transferring, it is imperative that clean instruments are being used and that they are soaked in disinfectant often.

Most consumers of goat meat think they can be affected by the infected meat if eaten.

This is not true due to the fact the meat is tested for any harmful matter that could be transmitted to humans. If by chance an animal is confirmed with scrapie, the meat is then thrown out and the USDA office is notified. This is the same for dairy products. Because the meat has to be discarded, this

costs the butcher a huge chunk of his profit because the rate of production is down and the product is not useful to them because they have already paid for the meat. To help avoid the confusion, all slaughterhouses require a special tag provided by the USDA. These tags are called scrapie tags and illegal to remove from an animal's ear if tagged. Each farm has its own farm number that is registered with the USDA. The tags are free to give the producer no excuse not to use them. Each tag has the state abbreviation, the specific farm identification and an animal identification number. A tag for the state of Tennessee for example would have printed on there: TNO12948 and below that, for instance, 0051. This special tag lets the slaughterhouse properly identify what goat and where it came from just by that little tag. The tags come in a few different styles such as plastic or metal. The plastic are more common in goats and sheep while many cattle producers use the metal ones, it is all just a preference. To order the tags, you can call the USDA office in your county and they will get your information and get your tags ordered! In fact, most veterinarians will not write a health certificate for shows and traveling or hauling. The Boer breed standards state that registered goats with their association are not required to have a scrapie tag as long as they are tattooed and accompanied by their registration papers, but does not matter to some veterinarians.

Say someone had a goat sent to the slaughterhouse to be processed, and said goat ended up being infected. The authorities would be contacted, and the farm identification number would be traced back to that specific farm. From there, "all sexually intact goats might be purchased and euthanized. (Likewise, in infected sheep flocks with goats on site; all sexually intact goats are purchased and euthanized)" (Northey). This is done to ensure all possible infected animals on that specific farm is clear in the system. This however does not account for any other animals sold off that farm that could possibly be infected and that could be harmful to the new herd it is in. Surprisingly, there are no rules

suggesting it is illegal to own or acquire any more animals in the future; seeing how that farm technically still scrapie in the ground has that could start the whole epidemic over.

Clearly, scrapie is the type of disease that harms not only the animal, but the farmer also. When scrapie is diagnosed on a farm, it can single handedly end the career for that farmer. A producer's farm and livestock are not just a job, it is a way of life. For many, they are not in it for the money, but that does not stop them from getting attached to their stock. They spend every morning and night spending every ounce of energy caring for the animals. Losing animals is a part of the business, but if they have scrapie the farmer will most likely not be able to diagnose it until it is too late. But, even if they did crack the code they could not be sure seeing how there is no test. And as we know, there is no treatment for the animal. All in all, the end result is death for the animal and heartache for the farmer. There must be a breakthrough in research sometime soon to help the farmer keep their herd alive and scrapie out of America.

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