



FIELD NOTES



THE NEWSLETTER OF
THE SOUTHWEST WISCONSIN CWD, DEER AND PREDATOR STUDY



Behind The Biopsy

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The Wisconsin DNR's Southwest CWD, Deer and Predator study seeks to evaluate the extent to which Chronic Wasting Disease impacts Wisconsin's deer population. To that end, researchers need to have a clear picture of how well CWD-infected deer survive compared to those who are not infected. Determining the CWD status of each deer we collar is vital to making this comparison, but with current technology, this information can only be ascertained through a tissue sample. As most deer hunters know, we can easily extract tissue samples from dead deer, but how do we retrieve samples from an animal that is still alive?

In order to effectively test a living organism for infection, we first have to understand where a disease lives in the body. The mechanism for infection in CWD is a prion. A prion is an improperly folded protein and is the culprit behind a host of neurodegenerative diseases that affect humans and animals alike, including some cases of dementia and the infamous Mad Cow disease. Prions accumulate in the lymphatic system, a vascular network that spans the entire body and is responsible for the transport of white blood cells, or lymphocytes, which fight infection. We are all familiar with how our lymph nodes swell when we get sick – these are the spots in deer where CWD prions appear in the highest concentrations.



This table shows results from the rectal biopsy testing for CWD on live deer captured during the 2019 winter deer collaring. “Not-detected” means that no prions were found in the lymph follicles in the tissue sample submitted for that deer. “Positive” means prions were detected, and it is confirmed that these deer are CWD-infected. “Prevalence” is simply the percentage of our deer in each sex and age-class that had a positive test result.

2019 Winter Trapping CWD Test Results					
	Age Class	Not-detected	Positive	Total	Prevalence
Female	>2yrs	50	12	62	19%
	20mo	22	3	25	12%
	8mo	57	2	59	3%
Male	>2yrs	11	1	12	8%
	20mo	9	2	11	18%
	8mo	53	2	55	4%
Total		202	22	224	10%

When it comes to sampling a dead deer for CWD, biopsies are usually extracted from the retropharyngeal lymph nodes, located in the general vicinity of the head and throat. These lymph nodes are inaccessible in deer while they are alive, an obstacle which researchers in the past have attempted to overcome by taking biopsies from the tonsils instead. However, a biopsy of this nature requires extensive training and is an invasive procedure that poses a number of risks for the animal. Lymph tissue is also found elsewhere in the body, including at the end of the rectum. Researchers in the Southwest WI CWD, Deer and Predator study target this area instead, as it is more easily accessible and still provides reliable results.

The process behind a rectal biopsy is fairly benign. Deer are anesthetized prior to the procedure, so they are unconscious for the duration. A topical anesthetic called lidocaine is applied to the area as well, to minimize pain when the biopsy is complete and the general anesthetic used on capture is reversed. The amount of tissue extracted is equivalent to the size of a penny. There is minimal bleeding and researchers have yet to observe incomplete healing or other complications as a result of the biopsy.

Once we’ve obtained a biopsy, the sample is tested using the same laboratory methods used for testing retropharyngeal lymphatic tissue in dead deer. There are a few instances in which this test is not 100% reliable – occasionally, when deer are in the early stages of infection, the test fails to detect the presence of CWD. However, the test is extremely reliable in detecting middle-to-late stage infections. The imperfect detection of CWD through rectal lymph tissue is not an obstacle to meeting our project objectives. Nearly all the deer we capture are tested both before and after death, and some are live-tested more than once,

so we do not rely on a single test to determine CWD-infection in most deer. Additionally, we incorporate previously published estimates of false-negative rates into our analysis.

Tissue sampling is also sometimes affected by the genetics of the deer in question, which may account for problems in detecting early-stage CWD in select deer. The rectal biopsy has been shown to be effective in determining the CWD status of deer who have the most common genetic make-up, regardless of the stage of the infection. Stay tuned for a future edition of Field Notes where we cover the interplay between CWD and deer genetics.

While the rectal biopsy is an important part of the Southwest WI CWD, Deer and Predator study, we still use the retropharyngeal biopsy on animals after death. We are continually working with researchers to find less invasive ways to detect CWD in live animals, but we believe the rectal biopsy is the best option for now. It is an effective procedure that allows us to conduct our work safely and humanely, without causing undue stress. Staff are well trained and are given ample opportunity to practice the biopsy on dead deer so that they are properly equipped to conduct the procedure in the field. Once we know the CWD status of a collared deer, we can determine whether CWD poses a significant impediment to its survival. Each biopsy improves our understanding of how this disease affects our deer population, and how it stands to do so down the road.

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