



CKWRI Opens Satellite Office In Lubbock; CWD Research Ongoing

By Colleen Schreiber on Wednesday, March 29, 2023

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SAN ANTONIO — At the recent Deer Associates annual gathering, an event hosted by the Caesar Kleberg Wildlife Research Institute (CKWRI), Mike Cherry, the head of CKWRI's deer program offered a broad overview of the many ongoing research projects of CKWRI's team. These days wildlife diseases, and in particular Chronic Wasting Disease (CWD), make up a big part of their research portfolio.

Before getting into the research overview, Cherry shared that CKWRI has expanded its geographic footprint to the Texas Panhandle and bordering states. CKWRI North is focused on big game research, namely mule deer, pronghorn antelope and aoudad. Assistant professor, Levi Heffelfinger, now stationed in Lubbock, heads up that program.

Already, Heffelfinger has secured \$2 million in research funding and another \$7 million plus in research proposals is pending. A pronghorn project with the Oklahoma Department of Conservation is set to start soon and there is another project with Oklahoma to study mule deer population dynamics. Researchers are also focused on finding ways to better estimate and monitor the mule deer population on a broad scale.

Cherry also highlighted the recently published "Advanced White-Tailed Deer Management – The Nutrition-Population Density Sweet Spot." The book is a compilation of one of the longest-running white-tailed deer research projects ever, Cherry said.

"This is the research that really taught us about density-independent population dynamics of whitetails in South Texas."

The book is available through Texas A&M Press.

Given the extreme South Texas heat, one of the ongoing research projects Cherry highlighted is focused on the thermal ecology of whitetails in South Texas. Specifically, researchers are learning about how thermal stress influences behavior, physiology, and ultimately population dynamics of whitetails. Much of the research is being conducted in their research deer facility on campus enabling researchers to have a level of control to evaluate deer behavior and physiology.

Cherry shared some of the novel new technologies they're using to investigate the topic. For example, a black globe used in the project is able to measure environmental parameters that include not just the ambient temperature, but also solar radiation, wind and heat radiated from the ground and other environmental sources.

They've also recently incorporated an implant that is able to log and transmit body temperature data every two minutes. A snapshot of one day's worth of data collected on two-minute cycles for one female showed great variation in body temperature, especially an increase in temperature from having run for several minutes. By simulating activity in the early morning hours, they've learned that it takes several hours for the body temperature to return to its average temperature after activity.

They've also deployed these implants in some pregnant females on the East Foundation's San Antonio Viejo Ranch where they're learning how internal body temperature influences things like habitat selection and other important physiological processes.

As for wildlife diseases, Cherry told the group that CKWRI researchers and its collaborators are working on CWD from several different fronts, one of which is the development of better models to predict the spread of the disease. They're also looking for better ways to monitor the environment for CWD. Additionally, researchers are looking for ways to live with the disease by using therapeutics to prevent the spread or slow the rate of transmission.

Cherry added that epidemiological models that predict how fast the disease is going to spread and how that spread rate is influenced by management options are only as good as the input data available. Thus, CKWRI researchers in partnership with Texas Parks and Wildlife, are parameterizing these models with real empirically driven field-based estimates of things like movement rates and habitat selection to improve predictability of disease spread.

In the Panhandle, CKWRI researchers have been monitoring movement of juvenile mule deer. Here too, the data is being used in part for epidemiological studies.

To do this 30 juveniles were equipped with GPS collars. Researchers were interested in learning how far these juveniles are dispersing as well as the proportion of individuals that are actually dispersing and the factors driving that dispersal.

"The movements that we've seen are quite profound," Cherry told participants.

Some individuals have dispersed to areas outside their home range. He noted that this is largely a male-biased process that is fairly seasonal.

They're also tracking what they call exploratory behavior. What surprised researchers and what's largely been ignored in epidemiological literature is this exploratory behavior which they've found is far more frequent than dispersals. Additionally, they've found that both sexes are involved in this type of behavior. In fact, two female fawns traveled 40 miles and then came back to their home range.

"Think about that from a disease dynamics scenario," said Cherry. "Those animals could pick up the disease anywhere along that path or spread that disease anywhere along that path, and then come back home with it."

He also noted that there are neighboring states and nations that have unknown CWD prevalence rates, and these deer are crossing over to these boundaries.

"Understanding how these animals are operating at this multi-state, multi-national scale is really going to be important as Texas embarks on this fight against this horrible disease."

CKWRI is also working on a grant in association with USDA and TPWD to understand how mineral status in individual deer influences the rate of the disease progression. Specifically, Cherry said there is some evidence at the molecular level that copper levels in the body can influence the rate at which these infectious prions spread throughout the body.

This season they worked with partnering ranches to harvest over 150 deer from which multiple tissues, including brain tissue, were extracted. Various labs are conducting a full mineral panel analyses. Additionally, the RT-QuIC test is being run to ensure that all animals are CWD negative.

Finally, they're using a new technique developed by colleagues at Creighton University. Semiquantitative protein misfolding cyclic amplification, PMCA, enables researchers to extract brain material from a deer with a known level of copper and then seed infectious CWD material into that deer's brain. Researchers then measure the rate at which the prions transform into the infectious misfolded prions, he explained.

"We hope to be able to correlate copper status with the rate of the propagation of new prions," said Cherry.

Ultimately, though the goal is to develop a tool that can be used to slow the rate of the disease progression within individuals and the shedding rate of that individual in the landscape to hopefully slow the spread of the disease across the landscape, he said.

CKWRI also continues their work on cattle fever tick in collaboration with USDA. To that end, CKWRI has been collaring deer along the Rio Grande in Zapata County and looking at how different deer densities influence movement processes at the international crossing and how frequent that movement is happening. They're also investigating the various habitats associated with captured deer heavily infested with ticks.

This past year, CKWRI in collaboration with the East Foundation on their EL Sauz ranch collared nilgai, whitetails and cattle all in the same area to understand how spatial overlapping interactions influence tick dynamics. The ultimate goal is to better understand how management techniques like having ivermectin-treated corn on the landscape for the deer or treating cattle for ticks influences tick dynamics.

Finally, he talked about another project with East Foundation where for the past three years they've been looking at the drivers influencing adult female and fawn survival in whitetails. Specifically, researchers are looking at the drivers influencing survival as well as the causes of mortality and the broad scale environmental conditions that influence all of this.

The team deployed transmitters that allowed them to navigate straight away to the birth sites. They were able to capture and collar 71 fawns at these birth sites over three years. The fawns were monitored multiple times per day in early life to determine the drivers of mortality.

Cherry acknowledged that most of those fawns captured at a day of age die, so they've supplemented that population with 81 additional juveniles at three and six months of age captured with helicopters and nets. In all, they've been able to monitor some 50 fawns through the first year of their life.

Cherry told the group that he's built a lot of population models for a lot of different state agencies using fawn survival data under what they now know to be a faulty assumption that fawn mortality plateaus at about 12 weeks of life.

"Without a doubt those first couple weeks show the fastest decline in the fawn population," said Cherry. "But no way does it plateau after that."

Over the last three years what they've seen in South Texas is dramatic swings in fawn survival rate based on weather patterns. As an example, he pointed to a freeze a couple of years ago that was followed by a lack of rain for several weeks. The result was a rapid die off of fawns on the ground.

"It was February, and we would typically consider them to be out of the woods at that point, but we're detecting quite a bit of variation in fawn survival clear out to a year of age," he reiterated.

They're also working on a project looking at early life conditions of fawns and how that ultimately influences the phenotypic expression and trait expression such as antler size and body size at maturity. It is very similar to some of the work CKWRI is doing in collaboration with TPWD on the Kerr Wildlife Management Area in an effort to understand how nutrition influences the offspring's body size and antlers.

Still another collaboration with the East Foundation is a program ongoing since 2011 to help train future leaders in conservation. As Cherry explained, universities are having a harder time finding experiential learning opportunities for their students. More and more of the work is happening in the classroom and less and less on the ranch. CKWRI and East Foundation are helping change that.

To date over 1800 students from 13 universities and four state agencies have gone through the program. It is a two-day hands-on training experience whereby students have an opportunity to come to one of the East Foundation ranches to learn the best capture and handling practices for whitetails. They're learning how to draw blood and accurately measure antlers as well as safe release methods.

Cherry said that with all the deer captured for this program and for other research purposes, CKWRI is also thinking about best handling and sampling protocols necessary to prevent further spread of CWD when capturing native deer out of CWD impacted areas. They're thinking, for example, about whether there is a need to have a set of masks, hobbles for the deer for each separate ranch.

"We are working through several protocols that are allowing us to feel a lot safer as we go through this process," Cherry concluded.



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