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CKWRI's Deer Research Is Wide-Ranging And All Encompassing

By Colleen Schreiber on Wednesday, March 27, 2024

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SAN ANTONIO — What has become a standard part of the annual Deer Associates meeting, Dr. Mike Cherry, head of the deer program at Caesar Kleberg Wildlife Research Institute (CKWRI) offered his annual update, a broad overview of the ongoing research within the Patton Center for Deer Research at CKWRI.

Last year the center launched its Panhandle research initiative with a new hire, Dr. Levi Heffelfinger, now based in Lubbock. This year they've also begun a Hill Country initiative. One of the research projects being launched in the Hill Country is looking at how juniper removal techniques and other land use legacies associated with those habitat management treatments influence wildlife communities.

"We're particularly interested in how different habitat management techniques influence the productivity and nutritional condition of the deer herd," Cherry told the group.

Because the exotic population is so large now in the Hill Country, CKWRI researchers will also be looking at how exotics compete with whitetails, and how that competition influences the abundance, distribution and nutritional condition of native whitetails. The first graduate student who will head up this project has been hired.

In South Texas, the focal region for most of CKWRI's research, a new project has been initiated on the Faith Ranch in southwest Texas to better understand the benefits or drawbacks of cottonseed as a supplemental feed source as compared to the pelleted feed for deer productivity. It's an important study as cottonseed as a supplemental feed has grown in popularity among deer enthusiasts and managers. Specifically, it is a little easier to handle, is resistant to moisture, and is less preferred by the non-target species, namely feral pigs, said Cherry.

However, there are some concerns, the primary one being that the toxic element, gossypol, is known to cause sterility in livestock. With that in mind, researchers are interested in how deer use these two different feedstuffs, separately or in combination, and ultimately how that influences recruitment.

Researchers are also very interested in the timing of feeding deer. Operationally, many ranches feed one or both feedstuffs throughout the year, then switch to corn during the actual hunting season or stop their feeding regime all together during the harvest season. Here too researchers have questions about how that might influence recruitment.

"We know with livestock, the condition of an ovulating female is really critical and can impact their offspring," Cherry noted. "Such impacts are unmeasured for whitetails."

CKWRI also continues its ongoing work to understand thermal ecology of whitetail deer. In their captive facility researchers are experimentally manipulating the environment and have been measuring the physiological aspects of the deer as well as stress hormones and thyroid hormones indicative of metabolism rates, diet selection and behavior of whitetails.

Disease management is another major component of CKWRI's research program, and that effort is continually increasing particularly with the spread of Chronic Wasting Disease. CKWRI is working with USDA, TPWD and some private entities to look for management and control solutions, for better surveillance methods and predictive disease models to better understand how CWD surveillance in wild populations should be conducted, said Cherry.

There is some evidence that suggests that at the molecular level, copper and zinc can bind the prions and potentially slow the progression of CWD and the misfolding of the prions. CKWRI researchers are further investing that possibility.

"The evidence for this is very limited and has never been tested in live animals," Cherry told participants. "We have seen in the laboratory that if you spike a lymph node with copper, it changes the dynamics of how prions move through the lymph node which gives us some encouragement that there's potentially a pathway that different mineral concentrations in the blood and brain may influence the progression of CWD with an individual and the amount to which they're shedding prions in the landscape."

He reiterated again that it's all very preliminary and only the first step to test it in a live setting is now underway. It involves evaluating the range of copper and zinc levels seen in wild deer in South Texas. Over the last year, some 150 deer have been harvested and biological samples processed to identify the level of copper and zinc in the blood, brain and other parts of the body.

They've then taken those materials to another lab where they've injected prions into those materials and watched the rate of propagation of the disease. The last step is still underway, so results are still unknown.

Cherry told the group that it is exciting that they are seeing some variation in the zinc and copper levels. On the East Foundation, one of CKWRI's partners on the project, the native deer are receiving no supplementation so the only thing that is influencing the copper and zinc levels in these deer comes from the native vegetation they are consuming.

On another ranch, deer have access to pelleted feed with additional copper and zinc added to increase the bioavailability of copper to those deer. Whether there are any therapeutic benefits to that is yet to be determined, he reiterated.

CKWRI and other researchers continue to investigate ways to develop better environmental sampling techniques so that landowners can get to some level of quantified certainty of whether the disease is on their property or not.

They're also working on developing better predictive models for better surveillance systems. Additionally, CKWRI has recently entered into an agreement with USGS to breed captive fawns.

The fawns will be shipped to a secure lab in Wisconsin where they will be exposed to CWD. Researchers will then begin to look for diagnostic approaches to better understand when they can pick up on CWD positive deer and ultimately hopefully improve upon existing diagnostic techniques and or perhaps develop new ones for CWD detection.

COVID is another disease they're studying in partnership with USDA and the vet school at Texas A&M. Cherry said that thus far COVID is not thought to be an important source of mortality for deer, but the data are limited. Where scientists and veterinarians do think there may be issues is as a co-infection.

"If a deer herd or a breeding facility is dealing with any type of respiratory issue, then COVID on top of pneumonia could be an important thing to understand," said Cherry.

Thus, researchers are seeking to understand how COVID is distributed across deer populations and the potential for that to influence population dynamics.

Toxoplasmosis is the number one foodborne illness that causes mortality and hospitalizations in the United States. However, little is known about how prevalent it is in white-tailed deer. To investigate this CKWRI has initiated another study with the East Foundation to try to understand how toxoplasmosis is distributed across their ranches and if and how the disease might influence recruitment in the native deer population.

He pointed to an interesting paper published a couple of years ago, that demonstrated that a toxoplasmosis positive wolf was more likely to become a pack leader.

"Toxoplasmosis has very predictable symptoms across mammals, including us," Cherry told participants. "It makes the mammal bolder and more willing to take risks. CDC has a whole list of symptoms for humans, and it's all translating very closely to what we're seeing in wildlife."

This project is targeting the reproductively active does because they are most vulnerable to impacts from the disease. What they've found thus far is 51 percent of the does sampled had toxoplasmosis and 49 percent did not.

Vaginal transmitters are inserted into captured does. This enables them to track fawn survival more easily by knowing exactly when the fawn is born. They're also redeploying the vaginal transmitters in those does and what they've already learned is that about 25 percent of the does have gone from positive to negative for toxoplasmosis.

CKWRI also continues its cattle fever tick research. Currently, GPS collars are deployed on cattle, nilgai and whitetails in the same area to understand, in part, how the fever tick is distributed and where there might be areas of overlap and a high probability of exchanging of ticks. They want to know if they can predict the tick burden on a captured animal based on their habitat selection.

"We're really trying to understand the drivers that support the disease," said Cherry.

In East Texas, CKWRI has recently launched a project with the T.L.L. Temple Foundation on the Boggy Slough Conservation Area to better understand how fire and timber management programs impact white-tailed deer, their predators and competitors.

"One thing we're hoping to understand is how these different management actions influence the nutritional condition of the deer herd," Cherry said. "We're also trying to develop techniques that allow us to quantify differences in nutritional condition using camera data."

Next the idea would be to link that information to forestry practices, to prescribed fire, to competitors such as feral pigs to understand drivers of nutritional condition of deer.

An educational effort to train the next generation of conservation leaders, ongoing for over a decade now, continues in partnership with the East Foundation. The primary impetus behind this effort was that college students in various wildlife-related or conservation-related programs have lost experiential learning. Specifically, they do not get out in the field like they once did. Thus, for five weekends out of the year, students come to the East Foundation for some of hands-on in-the-field training. For example, they learn how to safely handle deer and how to collect biological samples to track nutrition and population dynamics of deer.

"This year, we caught around 400 deer across East Foundation ranches while training almost 200 students from 12 universities," said Cherry. "We also had 27 different professionals from five different state and federal agencies come out to learn from us how to safely conduct aerial captures of whitetails."

To date, they have over 6000 capture records being used to understand, for example, how rainfall influences nutritional condition, lactation rates and antler size in a system where supplemental feed is not used and where there are no introduced predator control measures.

"We're learning a lot about deer biology through this program, while simultaneously training the next generation of wildlife professionals working in deer management," said Cherry.

He pointed to one particularly exciting finding from this work. It is what scientists call physiological carryover effect of drought. Specifically, what they've learned is that July and August rainfall patterns influence stress hormones all the way through October but only for lactating does. He added that it takes a lot of data over a broad geographic area to reveal something like this.

Additionally, they've learned through this data set that the timing of resources and rainfall patterns influence offspring quality. It's well documented in South Texas that when rainfall declines fawn crops drop dramatically. What researchers assumed was that the survivors would do okay in part because the deer density would be lower. However, they've found just the opposite, said Cherry.

"In very low rainfall years even the survivors have a quality effect that is still evident when they're four months old all the way out to 18 months old," he told the group.

Also, rainfall patterns in April before the fawns were born was more predictive than the rainfall patterns during lactation or just before capture in terms of body mass of fawns and yearlings.

Researchers also trying to understand survival rates of whitetail fawns and the causes of mortality in a system that does not have an exploited predator population. The study is now four years in. Does are captured in March and a vaginal implant transmitter is deployed that is expelled just before parturition. Again, that makes it easier to capture the fawns right at their birth. Those fawns are checked on every eight hours. When there is a mortality then researchers investigate the site and try to understand what happened.

Thus far, they've tracked three cohorts of fawns for an entire year. What they've seen thus far is fawn survival drops very precipitously during the first few days of life.

Most fawn survival research data stops after 12 weeks because it was assumed that if a fawn made it to 12 weeks its chances of survival were stable, Cherry told the group. However, for this study they've continued tracking the fawns beyond that standard 12 weeks.

"Interestingly, we've seen quite a bit of variation, in fact, more variation in overwinter survival compared to the first 12 weeks of a fawn's life," said Cherry.

More importantly while fawns did not die during the extreme winter events that have occurred in South Texas the last few years, when it didn't rain following those cold snaps and there was almost no forage, they were finding dead fawns every few days.

"We saw fawn survival drop another 10 to 22 percent after three to four months of life on out to a year," Cherry told the group.

As for predator impact on the population, while they've seen feral hogs and even bobcats killing fawns, predation by those species is relatively trivial compared to coyote mortality. As for the unknown cause of which they are quite a few, they're using swabs of the bite marks on the fawns to take to the genetics lab to try to identify the species of predator.

In the Panhandle, work continues to better understand mule deer ecology. One of the more interesting topics they're investigating is site fidelity. What they've found thus far is the mule deer are using a lot of different ranges over a year's time.

Because of their work in the Panhandle, CKWRI has now been invited to cooperate with Oklahoma wildlife officials on big game ecology and management projects. A study on pronghorn survival in the Panhandle of Oklahoma is also now three years in.

"We're trying to understand how things like predation, energy development and other disturbances are influencing pronghorn population dynamics," said Cherry.

He added that this is an area where there are more commodity crops than other parts of the pronghorn's range, and the pronghorn population is on the eastern fringe of their normal range. Thus, researchers are trying to better understand the drivers causing population decline.

"We're seeing only 12 to 18 percent fawn survival just out to 50 days," said Cherry. "This is not sustainable for any population, particularly one with low productivity."

Researchers are also trying to better understand how fences, roadways and railroads, any linear feature, influences movement of the pronghorn and then identify some mitigation strategies for better movement.

A mule deer project has also just been initiated with their Oklahoma partners. As Cherry explained, in Oklahoma, mule deer and whitetails are essentially managed as one game animal. Whitetails are doing better and so part of the study entails developing aerial survey and camera tracking techniques to estimate mule deer abundance and recruitment. Additionally, a mule deer fawn survival study is underway with the first capture already done.

The study is being done where the recent devastating wildfires have occurred giving researchers the opportunity to learn how wildfire influences a mule deer population.

Finally, CKWRI just launched a study to understand mountain lion ecology along the Rio Grande. Funded by the U.S. Fish and Wildlife Service, researchers are particularly interested in how dependent the South Texas lion population is on the Mexican population. Cherry told the group that the biggest question relates to the border barrier system and whether it has a negative impact on the genetics and population viability of mountain lions in South Texas.

Because CKWRI has long focused on landscape scale type projects, it typically takes years to gather, analyze and publish the data. When available, that information will be distributed to CKWRI's mass audience.



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