



## Prescribed Fire and Cattle Grazing to Manage Tanglehead for Wildlife Habitat Improvement

by Alfonso Ortega-S., Chase Walther, Alex DiMaggio, Rider Combs, Jose Mata, Humberto Perotto-Baldivieso, Sandra Rideout-Hanzak, and David Wester

Invasive species are a real threat to wildlife habitat. In 2001, when I (AOS) first came to Kingsville to join the CKWRI, I was asked if I knew how to kill Guineagrass. My response was simple... "I spent 18 years of my life trying to make it survive in Mexico, and we killed it in many places; of course I know how to kill it!" Since then, many other invasive grasses have become problems for wildlife conservation, and tanglehead has become a significant problem for ranchers. Tanglehead is a native grass previously considered a "decreaser" and good forage for cattle. But, it has become invasive in native rangelands of the South Texas sand sheet, a prime area for white-tailed deer and bobwhite hunting. Thousands of acres of tanglehead monocultures are replacing critical wildlife habitat, with very low palatability for cattle when mature also.

Tanglehead should be about 5% of the native vegetation cover in the sand sheet. Groups of 2 or 3 plants spaced throughout the landscape make good fawning cover or nesting cover for bobwhites and wild turkeys. When tanglehead starts spreading across a pasture, glyphosate at 24 or 36 oz/ac can be used to kill individual tanglehead bunches. Monitoring how the population of tanglehead is changing over time is crucial because it can increase very rapidly. For example, in Kleberg and Jim Hogg Counties it increased from



Prescribed burn conducted in a tanglehead-dominated pasture with 5,000 lb/ac of fuel.

1.4% in 1999 to 17.8% in 2014. Changes in rainfall patterns from spring to summer and removal of cattle grazing on many ranches that want to shift their focus to wildlife are considered the most important causes.

Lack of action in early stages of tanglehead invasion may lead to monocultures that require treatment. We have been successful using prescribed fire and cattle grazing in this situation. The capacity of tanglehead to accumulate forage (about 5000 lb/ac) is an advantage for using prescribed fire. In addition to the reduction of fine fuel and plant mortality, the new growth of tanglehead is both more palatable and nutritious. Tanglehead can increase from 4% crude protein to 16% by 34 days after fire. Burning about 10% of the pasture with a cattle stocking rate of about 20



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Drs. Ortega-S., Perotto-Baldivieso, Rideout-Hanzak and Wester are Research Scientists at CKWRI. Mr. Walther, Ms. DiMaggio, Mr. Combs and Mr. Mata are former graduate students at the CKWRI. ~

acres per animal unit reduced the tanglehead population and increased the number of native plant species by 275-300%. Also, tanglehead utilization was 42-52% in burned areas compared to 6-7% in non-burned areas, and cattle used the burned areas 4.5 times more than the non-burned areas.

In areas that were burned and grazed, tanglehead basal circumference did not increase, while in areas that were either burned or grazed, and control areas it increased 2.8 to 4.7 inches. Tanglehead cover remained the same in the burned and grazed area while in either burned or grazed, and control areas it increased from 24 to 54%.

Prescribed burns may be conducted in November or February with similar results. The increase in the number of plant species and bare ground made the habitat more attractive for bobwhites. The first two years of the study (November burns 2017-2018) we counted 71 bobwhites in burned and grazed areas compared to 16 in control areas. From 2019 to 2020 we counted 91, 45, and 70 bobwhites in February burns, November burns, and controls, respectively. We believe that by increasing the number of burned patches from November 2017 through February 2019, the mosaic of non-burned areas with those burned at different times, created more attractive habitat to bobwhites, and this mosaic of different growth stages increased the use of not only the burned and grazed areas but the non-burned control patches as well.

#### Recommendations:

- A tanglehead plant every 30 steps creates good nesting cover for bobwhites, wild turkeys, and other grassland birds, as well as fawning cover. Glyphosate at 24 or 36 oz/ac can be used to kill individual plants or spots of tanglehead.
- Monocultures of tanglehead can be managed with prescribed fire in November or February followed by cattle grazing.
- When conditions are not proper for prescribed fire, mowing spots with high density of tanglehead to encourage regrowth and attract cattle to these spots may yield similar results to using prescribed fire.
- Burned spots should not represent more than 10% of the pasture area, and new areas should be burned every other year. ~

#### What Do They Eat?

Green sea turtles from the Mediterranean have foraged in the same North African seagrass meadows for about 3,000 years. (de Kock et al. 2023. Ecology. <https://www.pnas.org/doi/abs/10.1073/pnas.2220747120>)

#### Did You Know?

While only male wild turkeys gobble, both sexes may cackle when flying down from a roost or purr when traveling on foot. (All About Birds. The Cornell Lab. [https://www.allaboutbirds.org/guide/Wild\\_Turkey/sounds#](https://www.allaboutbirds.org/guide/Wild_Turkey/sounds#))

### CKWRI News



Lauren Fisher



Ben Wallace

#### New Advisory Board Members

Our Advisory Board has two new faces in Lauren Fisher from San Antonio and Ben Wallace of Corpus Christi. We are grateful for their willingness to serve, and we welcome them aboard!

#### New Science Team Members

The CKWRI is excited to have two new Research Scientists and Assistant Professors! Drs. Alynn Martin and Lisanne Petracca joined our ranks earlier this year. Dr. Martin is a Disease Ecologist and Epidemiologist, and Dr. Petracca is a Carnivore Ecologist. We are looking forward to all the fantastic research projects they will lead over the years!



Alynn Martin, PhD



Lisanne Petracca, PhD

# Exploring the Mystery of Mule Deer Rut Behavior

by Levi Heffelfinger

All deer species in North America are polygamous, which describes behavior in which an individual attempts to reproduce with multiple individuals. Deer have adapted various behaviors to better acquire mates, beyond males simply growing larger and developing antlers. These additional behaviors are called mate-search strategies where two main types seem to be prominent in deer, “harem” and “tending bond” strategies. Elk are a great example of harem strategy users, where a mature, dominant bull elk will collect, protect, and exclusively mate with a group of females while warding off competitors. White-tailed deer, however, are an example of tending bond strategy users. Males often establish the dominance pecking order leading up to rut, and then spend their time alone searching for females in estrus that the males then tend and protect from breeding by other males.

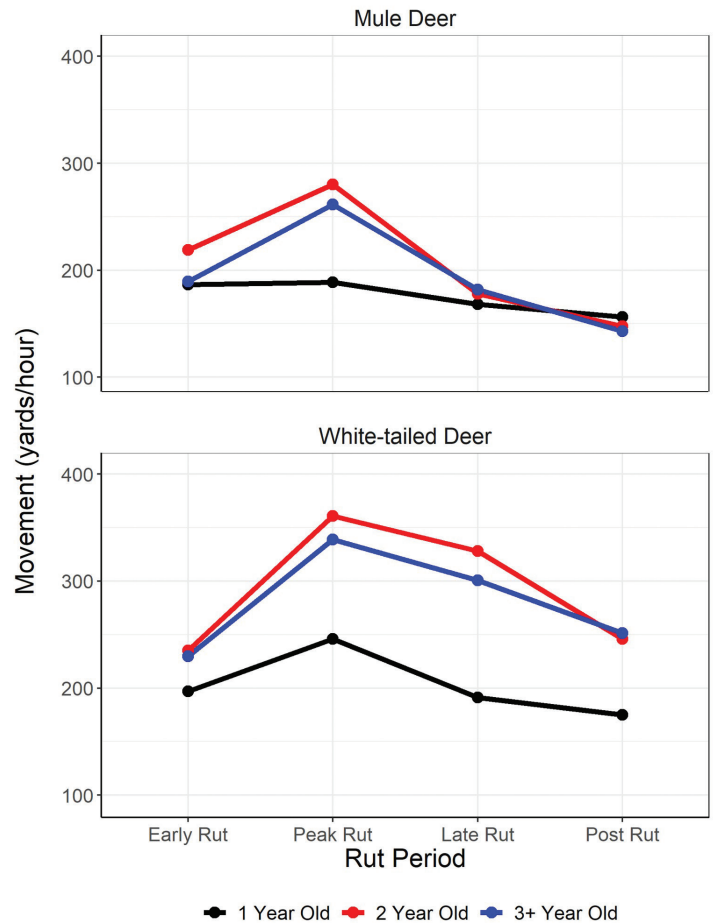
Mule deer are a species whose mate-search strategy remains unclear. Often, hunters observe mule deer bucks tending a harem of females during the rut, like elk do. However, many times the opposite is observed, where a mule deer buck is chasing a female similar to the behavior of white-tailed deer. There have been observational studies looking at rut behavior of white-tailed and mule deer that show a clear signal for whitetails performing a tending bond. However, the mule deer data are “messy” and are like hunter’s observations where the deer are sometimes in pairs and sometimes in larger groups.

Previous work by CKWRI scientists, Drs. Aaron Foley and Randy DeYoung, and others have evaluated

Dr. Levi Heffelfinger is the Director of the North Texas Research Program and Assistant Professor at CKWRI. ~



A mature mule deer buck seemingly protecting a harem of females including two collared individuals.



Movement of Texas Panhandle mule deer (top) and South Texas white-tailed deer (bottom) based on age class and rut stage. White-tail data are from a 2015 article by Dr. Aaron Foley and others at: <https://academic.oup.com/jmammal/article/96/2/279/900871>

white-tailed deer mate-searching using GPS collar data. We are now replicating these studies in mule deer as a means of comparison between species. A recent Texas Panhandle study accumulated GPS collar data from 146 mule deer, including 69 bucks. We used these data to look at movement rates and area used by bucks throughout stages of rut. So far, we have seen similar results to whitetails. From early-rut through peak-rut, mule deer bucks increase the amount of movement and space use, like white-tailed bucks, in search of receptive females. After peak-rut, movement rates and space use size then begin dropping off, although it is seemingly quicker than in white-tailed deer. Additionally, mule deer bucks at least 2 years old seem to move more than other bucks. Yearlings do not spend as much time looking for females, again like whitetails.

These results raise some questions. If mule deer are mate-searching like whitetails, then why do hunters and landowners often see harem-like groups of mule deer during the rut? Also, how can mule deer

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perform a tending bond during the large migrations of western Rocky Mountain populations? Perhaps the mule deer mate-search strategy is a behavior that's fluid based on circumstance. The Texas Panhandle has extensive agriculture and moderate to high densities of mule deer which may provide a similar mating scenario to whitetails. In areas of low mule deer density, it might be advantageous for a mule deer buck to find a group of females and protect them for the entirety of rut as opposed to wandering the landscape in hopes of finding mates. Further, migratory populations (unlike the Texas Panhandle) might be forced to perform harem-like behavior because many deer are concentrated into small areas where single pairs cannot separate from the group. We are looking into more ways to answer these questions with further analyses and by combining datasets with nearby states where deer undergo varying scenarios that could shape their rut behavior. But for now, the jury is still out on whether mule deer act like small elk or big whitetails during the rut. ~

## Saying Goodbye

It's not easy to say goodbye to cherished friends and colleagues, but Drs. David Wester and Lenny Brennan are embarking on their retirement adventures. Dr. Wester joined our team in 2011 and held the Frances and Peter Swenson Endowed Chair in Rangeland and Restoration Research while supporting us all with his statistical analysis skills. Dr. Brennan was the C. C. Winn Endowed Chair in the Richard M. Kleberg Jr. Center for Quail Research. He joined the CKWRI in 1993 and spent his career studying bobwhite and other quail species. Well done, Gentlemen. We will miss you both.



David Wester, PhD



Lenny Brennan, PhD



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