



Photo by Fidel Hernandez

## FROM THE FIELD: Tanglehead: Understanding an Emerging Threat to Quail Habitat in South Texas



Photo by Aaron Tjelmeland

**I**nvasive grasses negatively impact quail populations in South Texas. These invasive grasses, which are generally exotic (not from US), can reduce necessary habitat components for quail such as bare ground, forb abundance and diversity, and insect abundance and diversity. Most of these grasses were introduced primarily to increase forage production on rangelands.

In recent years, landowners in parts of South Texas have begun to

experience problems with a native grass, tanglehead, which is invading large areas considered to be some of the best quail hunting in the nation. Recent research from the Caesar Kleberg Wildlife Research Institute (CKWRI) suggests that tanglehead may have negative impacts on quail habitat similar to those of exotic, invasive grasses.

Tanglehead's range includes many areas of the world such as southwestern U.S., Hawaii, Mexico,

India, Australia, and several African and European countries. Although it is generally considered native to Texas, it was likely spread by early travelers, possibly before European settlement. Its origins, therefore, are unknown.

Whether native or not, tanglehead was rarely documented as an abundant component of south Texas grasslands. The recent increase, however, has resulted in large tracts of land becoming near monocultures of tanglehead in the South Texas sand sheet. Within the last year, we have visited with landowners, managers, and fellow scientists in an effort to understand why tanglehead has become problematic in some areas and to find ways to effectively manage these areas.

Tanglehead appears to invade and do best on sandy loam and similar soils. It will persist on rocky and fine sand soils but does not seem to spread aggressively. On soils where it does well, it is able to out-compete not only native grasses, but also exotic grasses such as buffelgrass and Kleberg bluestem. Tanglehead spreads only by seeds. Unlike many other invasive species, the seeds are not dispersed by wind but instead have a harpoon-like shape that is able to lodge into clothing, animal fur and onto equipment where it

# FROM THE FIELD

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can then be dispersed to new areas. Once established, tanglehead will form clumps and colonies that will grow as seeds fall off and establish in the soils around those patches.

There are several theories for the recent tanglehead expansion in South Texas. One hypothesis is that an exotic variety of tanglehead, one better suited to the conditions, became introduced. A potential source for an exotic variety of tanglehead is from Australia that is thought to have been

introduced along with silky bluestem and rhodesgrass planted near San Antonio in the 1940's. The bygone sheep industry in South Texas and shipping trade are other avenues that could have introduced tanglehead much earlier. We've begun to work with Dr. James Manhart of Texas A&M University and Dr. Randy DeYoung of CKWRI to develop a plan to study the genetics of tanglehead populations around the state and the world in an attempt to determine if this invasive tanglehead is in fact native to the region.

Another hypothesis regarding the tanglehead expansion is that weather patterns have driven the increase. To evaluate this hypothesis, we've begun to look at how tanglehead responds to environmental conditions. We have set up monitoring locations to determine how fast the grass expands. Late last year, on one monitoring location in Duval County, tanglehead increased 60% in a 2 month period. This was likely an extreme example, as many grasses were recovering from a bad drought and had received quite a bit of rainfall. We hope to understand how long it takes for tanglehead to dominate an area once it appears and how it is affected by other factors such as soils.

A third hypothesis is that large-scale reductions of cattle across South Texas may have contributed to tanglehead's expansion. Tanglehead in problem areas has been more difficult to manage because it can quickly produce a seed head and loses much of its palatability to cattle once it does. Cattle are often an effective tool for habitat management, but managers who want to use it on tanglehead are forced to constantly

burn it in order to make it available to cattle, similar to gulf cordgrass. Even after burns, in some cases, cattle will prefer to graze other grasses first and will not detrimentally graze tanglehead before it becomes unpalatable once again. Additionally, there's been speculation that fire may promote the spread of tanglehead. We have initiated several experiments and observational studies to help determine the effect that various management practices have on tanglehead in an effort to improve and restore habitat for quail and other wildlife species. These studies include prescribe fire, herbicides, disking, mowing, and grazing.

Research on tanglehead has only begun. Thus, there is a lot to learn about this species. As with most other invasive grasses, there is no silver bullet for tanglehead control or management. Our goal is to develop management recommendations for this emerging habitat threat based on our research.

Tanglehead is yet another management challenge for wildlife in South Texas. Although we do not yet know what factors are driving the recent tanglehead expansion, our scientific understanding must continue to best inform management efforts.

- Aaron Tjelmeland and Fred C. Bryant

Aaron is a native of Iowa and a Research Associate with the Caesar Kleberg Wildlife Research Institute. For his thesis, he investigated the impacts of buffelgrass on bobwhite habitat use in South Texas.



## A DECADE OF PROGRESS

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This summer marks the 10<sup>th</sup> bobwhite nesting season since I moved to Texas in 2001. A ten-year time frame provides an opportunity to look back with meaningful perspective and use this perspective to look forward to what the future may bring. Thus, I decided to use this essay to share some observations about bobwhites in South Texas that I have gained over the past decade.

**South Texas Quail Habitat.** During the past ten years or so, South Texas quail managers have developed a high level of appreciation of the important role that bunchgrasses play in bobwhite nesting. While I do not have concrete data, it is quite clear that many ranchers in South Texas have decreased their grazing intensity during the past ten years. I believe that leaving adequate grass cover for nesting has been a key motive behind the reduction in cattle numbers on the landscape.

Our data from the first few years of the South Texas Quail Associates Program indicated that people who tended to maximize the amount of nesting cover in their pastures also has the highest levels of quail productivity. As word of this relationship spread, more people tended to remove or reduce cattle in order to increase grass cover for nesting quail. While this trend was, at first, a good thing, it eventually became negative thing due to the Law of Unintended Consequences. In the sub-tropical environments of South Texas, grassy cover, in the absence



Photo by Fidel Hernandez

of disturbances from grazing, fire, aeration or disking, after about 3–5 years, became too thick and rank to be optimal for quail.

I experienced a great example of how the Law of Unintended Consequences can influence quail management during a hunt several years ago. During 2001, I hunted quail on a pasture that was probably the premier example of South Texas quail habitat that I had ever seen. All hunters shot their limits within a couple of hours of hunting, and the hunters, guides, and dog handlers were thrilled to have been part of a great quail hunting experience.

Three years later, on this same pasture, we experienced the other end of the spectrum. By that time, the grass cover had been growing for about five years, and there had been no cattle present or fire applied over that five-year period. Coveys were few and far between. The grass cover was so tall and rank that dogs

repeatedly got lost, or were missed when they were on point. When we were able to see the dogs on point, wading through the waist-high grass hummocks was like trudging through a deep snow drift. More often than not, the birds flushed long before we could get close enough for a good shot. None of us even shot close to our limits. It was a long, tough afternoon to say the least.

Later that year, a timely application of prescribed fire brought the undergrazed pasture back into optimal condition for quail and quail hunting. While this was something of a cautionary management tale, it also points to a new management philosophy, where the approach was to manage habitat from the “top down” by using fire, grazing, or other disturbances to move the habitat pendulum from “too thick” to “just right.” This was very different than approaching things from a “bottom up” perspective by waiting for grass

## ON POINT...

to grow back after being grazed too heavily for too long.

### **South Texas Quail Populations.**

The shift in the cattle management approach has had, in my view, an interesting and overall positive effect on quail populations and their habitat. Having abundant grass cover available for quail through time is an ideal set of circumstances. This is because rainfall in South Texas is far too often an unpredictable resource. We never know when or if a string of sunny days is really the beginning of the next drought. When it comes to bobwhite nesting, it is important that abundant and high-quality nesting cover be present, even through periods of drought and heat. While the birds shut down their nesting attempts during periods of drought and heat, it is absolutely critical that abundant, grassy nesting cover remains available so that the birds can capitalize on the opportunity to nest when it finally does rain. During the past 10 years, there were at least 4 or 5 nesting seasons where an abundance of nesting cover during dry periods permitted birds

to respond quickly and positively to rainfall when it occurred.

We have also observed some of the most productive quail nesting seasons on record during the past decade. Previously, the highest juvenile:adult ratio of a bobwhite population in South Texas was slightly greater than 7:1, observed by Bill Kiel back in the 1970s. During the 2007-2008 hunting season, we observed juvenile:adult age ratios greater than 8.4:1 based on data from the Quail Associates Program. Although it can't be proved, I believe that the presence of abundant, high-quality nesting cover was, in at least some part, responsible for this high level of productivity.

**South Texas Quail Future.** In contrast to the record productivity of the 2007 and 2008 nesting seasons, we observed a near total collapse of bobwhite numbers because of the historic drought of 2009. The limited data that we have on juvenile:adult ratios from the 2009-2010 hunting season indicated that productivity ranged from meager (1:1 juvenile:adult ratio on a property that

experienced a brief rain event in May) to essentially non-existent (a 0.25:1 juvenile:adult ratio on a property that was probably typical of much of South Texas).

Despite the near total lack of bobwhite productivity in 2009, I am optimistic for a robust population recovery. This is because El Nino conditions resulted in a cool, wet 2009-2010 winter, and spring rains have been relatively consistent across much of South Texas. I am also optimistic because few people hunted quail in South Texas during the 2009-2010 season, and most, if not all, of the quail hunters and managers have maintained excellent, high-quality nesting cover over vast areas of South Texas.

Lastly, I am also seeing a number of quail operations positioning themselves to get back into the cattle business. This is because they realize that cattle, as well as fire and disking and aeration, can manage grass and habitat for quail in a top down manner. In my view, this kind of progress is a good thing.

- Lenny Brennan, C. C. "Charlie" Winn  
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