



Tanglehead in South Texas

Changes and Challenges

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Let's begin at the beginning: tanglehead is a native grass that's been a part of our South Texas rangelands for a long, long time. In fact, the USDA Natural Resources Conservation Service includes tanglehead in its description of the so-called "Historic Climax Plant Community" in many areas throughout Texas; and, its inclusion in the *historic* community means that tanglehead is a native grass, a plant that "belongs to the family" on our landscapes.

It is also true, however, that early descriptions of tanglehead in South Texas suggest that the plant was "frequent but not abundant" and also less common in grazed settings. In fact, many traditional range managers called tanglehead "a decreaser," which means that the grass is a "good forage grass" that decreases in abundance under heavy livestock grazing.

Forrest Smith, the director of *South Texas Natives*, a program housed in the Caesar Kleberg Wildlife Research Institute at Texas A&M University-Kingsville, wrote an article in 2010 about changes in our South Texas rangelands that have taken place in last 100 years or so. His article, "Texas Today: A Sea of the Wrong Grasses," is an insightful analysis of changes wrought by the introduction and expansion of exotic forage grasses. It should be "required reading" for all of us who love our native landscapes and who are responsible for passing them along to future generations.

Since the late 1990s, the Sand Sheet



A dense stand of tanglehead plants.

of South Texas, an area covering about 2 million acres in Kenedy, Brooks and surrounding counties, has witnessed a dramatic change in vegetation that has involved an explosive expansion of tanglehead. Researchers at CKWRI have studied this phenomenon for many years in attempt to better understand its effects on the landscapes that represent what Tim Fulbright and Fred Bryant of CKWRI called "The Last Great Habitat" in Texas.

We've documented the rate of tanglehead's increase in a study area south of Benavidez, Texas. In 2011, we mapped the location and extent of every tanglehead plant or group of plants in a 160-acre study area that had been enrolled

in the Conservation Reserve Program over 25 years ago. As such, it had been planted with a mixture of Kleingrass and Wilman lovegrass, common exotic grasses used in CRP plantings at the time.

During the years since the CRP planting, the area was invaded with Old World Bluestems and buffelgrass, providing another example of what Smith so aptly described. But tanglehead also popped up in our study area. At first, we noticed only a few plants here and there.

What happened between 2011 and 2013, however, was nothing short of alarming; the area covered by tanglehead increased over 100 percent during these two short years; furthermore, this increase took

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place during 2011 the driest year on record *and* at the expense of buffelgrass and Old World bluestems, two plants that are “not easy to push around.”

This sort of explosion has taken place on thousands of acres throughout the Sand Sheet. Understanding how this has happened and what it means to our native plant communities is a major research focus at CKWRI.

Any major increase in a plant’s population begins with its regeneration niche, its ability to reproduce and establish itself in new areas. We conducted a study of tanglehead’s seed bank by collecting seeds, assessing their viability and germination potential, and burying these seeds in the soil in screen pouches for varying durations. Then, we retrieved these pouches and re-assessed their viability and germination potential.

We learned that both viability and potential for germination decrease over time. Seeds had 80 percent viability and germination potential at the time of burial but after 25 months in the soil, viability and germination decreased to about 20 percent. Although 20 percent viability in a seed bank is still a concern, it appears that tanglehead lacks the potential to form a persistent seedbank. This means reducing or limiting seed input into the soil and simply leaving seeds that are already in the soil undisturbed should help to reduce tanglehead’s reproduction potential.

Restoration of tanglehead-dominated areas has been met with variable success. Given the cost associated with seeding locally adapted native species, a natural question to ask addresses the seed banks of plant communities dominated by tanglehead compared to seed banks in native communities. We have investigated this issue by collecting soil samples from plant communities dominated by tanglehead, native species or a mixture of tanglehead and native plants.

Soil samples were collected in each of three years and potted in a greenhouse where we supplied sufficient water to germinate whatever seeds were present in these soils. The *diversity* of emerged seedlings—the number of different kinds of species—was similar among the three plant community types for each of the



The seeds on a tanglehead plant are “tangled.”

three years of samples we collected. The *size* of the seed bank—the number of seedlings that emerged—sometimes differed among plant community types, and this difference was usually attributed to a large number of tanglehead seedlings that emerged from tanglehead-dominated plant communities.

Now, it is not surprising that tanglehead-dominated soils can sometimes support massive numbers of tanglehead seeds. What is surprising, though, is that the diversity of the species in the seed banks of tanglehead-dominated plant communities is neither richer nor poorer than the diversity of seed banks in native plant communities. When this is coupled with an apparently non-persistent tanglehead seed bank, the important management implication is that soils in areas dominated by tanglehead may well still retain an adequate store of native species that is available for future establishment under the appropriate conditions.

Ranch managers in South Texas often use prescribed burning as a tool to manipulate vegetation, and so we’ve studied how burning might be used to manage tanglehead. One way to limit seed input into the soil is to conduct prescribed burning during autumn and early winter months. Not only are seeds on plants

destroyed before they are dispersed, but we have also documented relatively high mortality of adult tanglehead plants.

It’s also true that, following burning, tanglehead comes back with a vengeance; often, the soil surface is blanketed with a carpet of new seedlings. We’ve documented areas that have a seedling *in every square inch* of the soil surface following fire. What happens to these seedlings, of course, depends on rainfall following emergence. When conditions are dry following fire, we’ve measured high seedling mortality, so that seedling density was not different in burned and non-burned areas two or three months following fire. In contrast, when conditions are wet following fire, burned areas can have higher resulting tanglehead seedling density than non-burned area.

Tanglehead is a plant that was historically considered a valuable decreaser grass on our native rangelands. Since the late 1990s tanglehead’s populations have exploded throughout thousands of acres in sandy-textured soils in South Texas. Because its effects on native habitats are pervasive and far-reaching, we will continue to work on tanglehead related issues with solid science-based research that has practical applications. ☺