Written Testimony

Field Hearing: Losing Ground: The War on Buffelgrass in the Sonoran Desert

Buffelgrass is native to the veld of central Africa. Its taxonomic classification is as follows: Family: *Poaceae*, Grass Tribe: *Paniceae*, Genus and species : *Pennisetum cilare* (L.) Link (syn) *Cenchrus ciliaris L*. Buffelgrass is a perennial bunchgrass that is adapted to sub tropical habitats around the world. While being a native to sub tropical climate grasslands, buffelgrass is well adapted to dry periods and can withstand prolonged drought conditions. Buffelgrass was introduced the United States in the 1930's and that introduction failed. In the early 1940's a successful introduction was made. Buffelgrass was first introduced in Texas, New Mexico and Arizona, and fairly soon thereafter to neighboring states in Mexico. Buffelgrass began to show its invasive nature fairly early after introduction. Often perennial plants show a lag time of decades from the time of introduction to invasion, this was not quite the case for buffelgrass. According to the USDA's Plant Data base, buffelgrass is now found in 1O states, and is in Puerto Rico. Buffelgrass is widely found in Hawaii, along with fountain grass, *Pennisetum setaceum,* which has escaped urban landscapes and is invading the Sonoran Desert at well. Buffelgrass is one Australia's most unwanted plants and has invade vast areas of that country's deserts.

My first experience with buffelgrass was in about 1972 while doing rangeland improvement projects in south Texas. In that case, mixed brush was being removed from rangeland and this introduced African grass was being planted to increase forage production for livestock grazing. Buffelgrass showed advantages over the native grasses in that it was easy to establish from seed, reached maturity rapidly, and provided palatable forage to domestic livestock, especially cattle. Forage yield measurements showed that buffelgrass pastures could produce in excess of 4,000 pounds per acre, in years of favorable rainfall. In the mid 1970's I planted accessions of buffelgrass at the Texas Agricultural Experiment Stations at Lubbock and Spur, Texas to test them for winter hardiness. At that time forage plant breeders were attempting to increase cold tolerance in buffelgrass by crossing it with other species in the Cenchrus genus. The first winter was mild and some of the buffelgrass plants survived at both locations. However in the second winter low temperatures approached zero degrees and all of the plants were winter killed.

When I arrived in Arizona in 1977, buffelgrass was not very common, especially in the Phoenix area. However it was being planted in southern Arizona, including trial plantings on the Santa Rita Experimental Range. At Arizona State University, in about 1985 I began teaching the course "Range Plant Indentificaton". To instruct this class, we used, as part of the material, a plant list of 200 rangeland plant species utilized in the Society of Range Management annual meeting plant ID contest for undergraduate students. Buffelgrass was on this list. I liked to use fresh specimens if possible for laboratory instruction and ID tests. At this time, I could only find buffelgrass near the interchange at 7th Ave and I-10 in the Phoenix area. For several years, I would go to that site to collect buffelgrass. Later, about 1990, I was able to find it growing at industrial type areas in north Tempe. Before moving to ASU Polytechnic in 1999, I would collect buffelgrass on my bike ride to the ASU Tempe campus. It was also about this time when buffelgrass became established on "A" mountain in Tempe, since that was a site I would take students on fieldtrips for plant identification. At the present time, buffelgrass can be easily found along roadsides and other disturbed sites in what is known as the East Valley.

Buffelgrass is spreading along transportation corridors and is firmly established to the east of Fountain Hills. To the north of Phoenix, along I-17, it is found as far north as Black Canyon City. I believe

it will continue to spread northward and find microclimate sites for establishment and with the advent of climate change, will continue to advance into the upper Sonoran Desert characteristic of the landscapes north of the Phoenix area. Buffelgrass impacts the Sonoran Desert in two ways. One the presence of this plant can provide strong competition to native plants and result in a monotypic vegetation stand. This obviously decreases plant biodiversity, but also can change animal populations because of the limited food source and decrease overall biodiversity. Secondly, buffelgrass presents a perennial fine fuel that can promote wildfires. Sonoran Desert vegetation is not adapted to fire and many of the signature plants of the Sonoran Desert are killed in wild fires.

Buffelgrass is presenting a difficult case for vegetation managers. Vegetation managers have seven categories of management to direct toward a plant species. These include: (1). Prevention of introduction, (2). Manual, which can be labor intensive (3) Cultural practices which includes things like crop rotation and directed livestock grazing, (4). Mechanical treatments involve equipment like plows and mowing, however, on most Sonoran Desert sites, these actions would have little value, (5). Chemical treatments most commonly focus on herbicides, (6). Fire, and (7) Biological control agents.

There are reports of insect and plant disease damage to buffelgrass. A spittle bug can attack buffelgrass causing plant death, however, the common response by land managers who want buffelgrass is to burn the pasture to control the spittle bug. Buffelgrass developed under a natural fire regime in Africa and is tolerant to fire, although prescribed fire during summer dormancy can cause mortality to the population, but the losses are quickly replaced by seedling recruitment. Directed grazing as a form of biological control has been considered for buffelgrass, but buffelgrass is well adapted to grazing pressures. If "overgrazed" it can develop a decumbent growth form which helps it escape some of the grazing pressure. Manual removal of buffelgrass can be very effective. Manual control works best when the soil is moist and persons doing this practice return to the site for several years to find any new invading buffelgrass plants.

Herbicides can control buffelgrass. The most common herbicide applied for buffelgrass control is Roundup (glyphosate) or the generic equivalents of this herbicide. Roundup works best when buffelgrass is in a full green state. Glyphosate based herbicides are not selective herbicide hence, care during application is needed not to harm non-target plant species. In recent tests, Arsenal or Habitat herbicides (imazapyr) has been found to be effective against bufflegrass. Imazapyr also is not a selective herbicide, so collateral damage to non-target plants would be expected if this herbicide was applied as a broadcast spray. Buffelgrass can be controlled, based on research in Texas, with applications of Spike or Graslan (tebuthiuron. To get effective control tebuthiuron was applied at high rates, about 2 lbs ai/ac, and tebuthiuron is a persistent herbicide that ties readily to soil organic matter and plant tissues. Research for buffelgrass contol with herbicides with more selectivity have shown that buffelgrass is not very susceptible to those compounds. For example Oust herbicide (sulfometuron) is selective but has intermediate control effects on buffelgrass, as does Accent herbicide (nicosulfuron). These preliminary observations are from treatments made to buffelgrass in September of 2009. As with most perennial invasive species, conclusive statements as to vegetation management treatments should be made after 1 or 2 complete growing seasons. Herbicides more specifically developed for grasses (gramacides) have shown little effectiveness to buffelgrass control. What is needed at this time are controlled herbicide tests made to buffelgrass growing among native Sonoran Desert vegetation, using the best herbicide management practices.

My recommendation would to be actively begin research/demonstration tests for buffelgrass control in the Sonoran desert using the best information available. I believe this will involve a team approach and team members are present within Arizona to design, install, evaluate and interpret such

tests. A second recommendation is that an immediate effort be put forth by the Animal and Plant Health Inspection Service (APHIS), an agency within the US Department of Agriculture, charged with assisting in biological control strategies for management of invasive species, to find biological control agents targeted to buffelgrass.

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