

BIG BLUESTEM MANAGEMENT USING HIGH DENSITY/SHORT DURATION GRAZING

Root Prairie Galloways, Fountain, MN

Our project was an experiment with a pasture of big bluestem (*Andropogon gerardii*) prairie grasses in S.E. Minnesota. We established this pasture as a pure stand about 15 years ago with seed that was identified as being a local genotype originally from our area. The situation we were trying to address is that of a gradual invasion of unwanted cool season grasses and various forbs into a warm season grass pasture. Species of forbs that we are trying to control are typically referred to as weeds or noxious weeds or very invasive in a warm season grass pasture, and the unwanted grasses are mostly Kentucky blue grass and Smooth brome. Our goal was to reduce the quantity of these plants if possible without using herbicides but by instead using our cattle in an early spring graze. We grazed in the late April early May window of 2011, '12 and '13.

The study was set up to find out what effect a hard early spring graze on the dormant bluestem pasture could have on the existing and invading cool season grasses and forbs. A second aspect of the study was to attempt to establish two prairie legumes native to this pasture for added nitrogen in the soil.

Objectives:

1. To injure and set back the cool season grasses and unwanted forbs as much as possible just before the Big Bluestem began it's spring growth.
2. To try to establish two native legumes by broadcasting seed and using the cow's foot traffic to incorporate the seed into the soil as they grazed.

Processes:

- Fencing and waterlines were installed to facilitate rotational grazing. The water lines and dividing fences make it possible to leave the cattle out in a specific paddock instead of having them walking back and forth across already grazed areas to a more distant water source to drink and lay down.
- Native legumes. Seeds of Illinois bundle flower (*Desmanthus illinoensis*) and Purple prairie clover (*Dalea purpurea*) were purchased from a local native seed supplier and broadcast onto the pasture with an Earthway 2750 bag seeder. Seeds were planted into flats at the same time as broadcasting on the pasture to determine if they had good germination.
- Grazing pressure. Pounds per acre in total cattle weight when they are in a paddock calculated to an acre, i.e. 10 cows @ 1250 Lbs. = 12,500 lbs. on 1/8 of an acre is equal to 100,000 lbs./acre. We varied from 50,000 the first year, to 181,000 Lbs./ac. in year two. We moved the cattle onto the bluestem pasture and through paddocks that measured from approximately 50'x 100 to 60' x 100'. Time spent in a paddock was adjusted based on the amount of forage available for the cows, some paddocks could only support them for 6 hours but most made 10 - 12 hours so we could move them roughly twice in 24 hours. Temporary paddocks were created by a cross fence made from step in pigtail posts and lightweight poly wire on a spool attached at each end to the permanent electrified interior and perimeter fencing.

- Gathering the data. We worked with a grazing consultant, Howard Moechnig, *Midwest Grasslands*, who we knew of from grazing workshops we have attended in the past and from previous work on our other pastures. Howard used his scientific method for setting up the experiment by identifying the control area and then setting up points from which he would run the transects. Plant ID can be a challenge to most laymen and Howard was able to ID each plant found along the transect at every 1' interval. The transects were used once before the cattle grazed and then again in the late summers to get plant numbers for comparison. Howard also took clippings in designated places, which were then separated by species, dried and weighed to get the density per acre. All of the information on quantities and density of plants found was then transferred onto spreadsheets for analysis.
- Pasture walks. We hosted three pasture walks to share information with the public, local soil and water people, grazers, and prairie/grass enthusiasts. Howard facilitated and explained all the various aspects of what we were doing and answered many questions.

Conclusions

Our combined observations based on the data are as follows:

- 1) Illinois bundle flower interseeding by broadcast and foot traffic was a failure. No plants of either species were detected in the plant transects or in the clipping plots. In addition, the general scouting of the field did not turn up any evidence of either plant on the site. Alternatively, the germination and vigor of both of these species in the planted greenhouse type flats was excellent.
- 2) The amount of duff and litter decreased significantly through the period of the study, as did the bare soil areas. This indicates that the plant community became more vigorous and the plant stand thicker.
- 3) The yield of Kentucky bluegrass (*Poa pratensis*) increased 150% in the grazed section and 207% in the control section over the period of the study. Kentucky bluegrass is shown to be a tenacious invader of native plantings. While smooth brome grass and quack grass were detected in small amounts during the first period of data collection they did not persist.
- 4) Indiangrass (*Sorghastrum nutans*) was not intentionally seeded when the big bluestem was originally seeded, most likely there was some indiangrass seed in with additional big bluestem seed purchased to overseed onto the field in the fall about 5 years ago. Because the indiangrass is somewhat patchy in the stand it does not show up in all the clippings that were done, since the clipping sites were rotated each time. However the transect data indicates that the indiangrass is maintaining itself over time in both the grazed and ungrazed areas.
- 5) The yield of the warm season grass components increased in the grazed area, but only maintained or decreased slightly in the control area. It appears that the grazing techniques and management used leads to improved yields of the warm season grasses, in particular big bluestem.

- 6) The occurrence of forbs is quite variable. Many of the species annotated in the transect and clipping data were present in very small quantities, and persisted for only one or two years. Their presence is not consistent, which is found with data collection from other sites as well. In the control section, crownvetch (*Coronillavaria*) has become established. It most likely came in with seed when this field was planted. It is very persistent and has spread since this project was initiated.
- 7) Canada goldenrod (*Solidago Canadensis*) is present in both the grazed and the ungrazed control areas, although it persisted under the grazing, it did show a decrease of 29% with the early spring grazing compared to an increase in the ungrazed control area of 68%.

All other forbs identified in this study will be present during some seasons and not during others. It appears that they will not be problematic in terms of reducing the population of big bluestem in either a grazed or ungrazed scenario.



Interesting side notes:

Meadowlarks arrive in late April to use this pasture for nesting, we grazed very lightly through the paddocks we found them in.

We graze this pasture every July which hopefully inhibits seed distribution of the biennial wild parsnip as our cattle readily eat the immature seed heads off of the wild parsnip plants. We normally graze each July when that pasture is used in our grazing rotation for it's mid summer grass production. Suffering a very bad drought in the early summer of 2012 and again late summer of 2013 the big bluestem really demonstrated it's value to us as we relied on it heavily through those dry periods.

Each spring the cows became progressively better at eating the "weeds", by the last spring graze we observed them readily eating the young goldenrod plants which they had left the first year. They also added canadian thistle and a little hedge mustard to their menu. Our Galloways are low maintenance beef cows typically calving in Late May or June, putting them onto the dormant grass after winter hay, to hunt for weeds for a week or so did not appear to cause them any ill effects nutritionally, as they picked up a mouthful of lush green vegetation they had along with it 50 - 60% dried grass. This is a balanced way to transition from winter's hay feeding back to grazing, while avoiding too much of the "washy" grasses of spring. Putting them out onto the warm season pasture at this time allows our cool season pastures to gain more leaf growth for storing carbohydrates to feed their roots before turning the cows onto them to graze.



This mixing of soil and plant litter takes hoof action, and a little moisture, to pulverize and incorporate what is left of the weeds and last years dead grass, and to promote tillering of the bluestem roots.

The big bluestem is not injured by this and responds well by vegetatively reproducing, and thickening the stand.

We move them on to eat all of the green and then move them off to the next paddock to do the same.



Unfortunately we only achieved this kind of soil mixing in the second and third years after the broadcasting of the legume seeds, and on paddocks that did not receive the seed.

The same general area in July with plenty of grass.



While the cows are cleaning up the big bluestem pasture the cool season grass in the foreground has had a chance to get going. It looks like we were just finishing when the leaves on the oak trees were as big as squirrel's ears.



We really enjoyed the opportunity to do this study.

Thanks to Howard Moechnig, S.A.R.E. and the people from around the area who attended our pasture walks.

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