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Plant Chat

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Quack Cross Study

Plants recommended for saline sites include AC Saltlander and NewHy wheatgrasses. Genetically, both of these cultivars are crosses of quackgrass and bluebunch wheatgrass. While both were tested and found to have a bunch type growth, questions have been raised concerning their ability to spread by rhizomes. A replicated study was planted at the PMC on 5/21/2012 from plants grown in the greenhouse. The purpose of the study is to compare spread of AC Saltlander and NewHy to the parent species, quackgrass. Smooth brome, because of its rhizomatous spread was included as a check in the study. Following are some very preliminary data collected 5/16/2013. Additional data will be collected this year and for one to two more years. The plants were planted into a black, firm bed. No cultivation was done at or after planting. Measurements are the average from the 4 replications. There were 10 seedlings planted for each cultivar per replication.

Species	Cultivar	Average Height (inches)	Average *Width (inches)	**Stand Rating: 1=best, 3=poor
quackgrass x bluebunch	NewHy	15.9	31.3	1.89
quackgrass x bluebunch	AC Saltlander	15.0	32.8	1.79
quackgrass	common	10.0	38.8	1.42
smooth brome	Rebound	15.9	24.7	1.72

*width measured north to south

**thickness and uniformity of plant and spread: 1=thick and uniform

quackgrass

AC Saltlander

Trees and the Great Plains

Finding ways that trees can make life better in the Great Plains continues today. Some promising tree potentials on the horizon are:

- Lodgepole pine is another tree potentially adapted to the prairie windbreak needs. It has proven hardy in over 20 years of trials and studies and will be available for testing in field plantings across MN, SD, and ND in 2014.
- Douglas fir has grown well over the past 80 years at Mandan. It should be available for field planting trials in 2015.
- Establishing cottonwoods on dewatered flood plains is a concern. This spring, a study began using 6-foot long unrooted cuttings water jetted 6 feet deep; 4 to 5-foot tall cottonwoods grown in deep pots planted 4 feet deep and a control of traditional conservation stock. The drought of 2012 had severe impact on this study. The water table that was supposed to be at 5-6 feet deep was actually 8-12 feet deep. Results will continue to be monitored this year and plans are to repeat the trial in 2014 at a new location. Finding a way to establish cottonwoods on the dewatered flood plains will meet the needs of many landowners. Currently, these coarse textured flood plains are suited only for pine and juniper without irrigation.
- What tree can you plant on a saline soil other than Russian olive? The answer is not many. However, through the US Forest Service Research Lab at Rhinelander, WI, the PMC has obtained 7 clones of hybrid poplars that have proven tolerant of salinities to 9 mmhos. They are being grown out in the greenhouse and will be established in a trial on saline soils next spring. A ½-acre saline site with a gradient of salinity for the trial is needed for this trial.

For nearly 100 years research has shown that field windbreaks improve crop yields. They improve crop yields for $2 corn as well as $7 corn. Universities and NRCS foresters across 8-10 plains states are developing a multistate study that will utilize data from combine yield monitors to calculate the impact of windbreaks on crop yields at whole field scale. Since many producers have monitors and many of them have yield data from multiple years, 1-2 producers per county across the area could provide thousands of field years of data in a very short time. With this technology we can easily determine the windbreak impacts under modern farming practices.

Salinity Study

Soil salinity is a widespread concern for producers in the Dakotas, Minnesota, and Upper Great Plains. Excess soil salinity has an adverse impact on plant growth. Producers are interested in management strategies that reduce the impact of salinity over time. Years of evaluation indicate that one of the best strategies for reducing salinity impacts is to establish permanent vegetation of deep rooted plants that reduce surface evaporation and utilize excess soil water. There is an ongoing need for perennial forages that provide acceptable forage quality and exhibit high tolerance to saline soils.

The Bismarck Plant Materials Center continues to work with partners to evaluate and promote plant materials for saline sites. The PMC has partnered with the Carrington Research Extension Center, Foster and Stutsman County Soil Conservation Districts, and NRCS on a five-year study to evaluate perennial grass and legume species and varieties/lines for establishment and yield over time across a salinity gradient.

The plants utilized in this study are: ‘Rebound’ smooth bromegrass, ‘Fleet’ meadow bromegrass, ‘Mandan’ Canada wildrye, ‘‘Shoshone’ manystem wildrye, ‘Alkar’ tall wheatgrass, ‘Garrison’ creeping foxtail, ‘Forestburg’ switchgrass, ‘AC Saltlander’ green wheatgrass, AC Saltlander commercial mix, Red River Germplasm prairie cordgrass, CREC Germplasm prairie cordgrass, ‘Revenue’ slender wheatgrass, ‘Rodan’ western wheatgrass, ‘NewHy’ hybrid wheatgrass, ‘O’Conners’ strawberry clover, and 12 varieties/lines of alfalfa.

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Following are observations after three years.

Salinity:

- Salinity levels are measured at each clip location and each clipping. There is considerable fluctuation in those levels within season and between seasons. Thus, it is difficult to correlate results to a specific reading without also considering the average of all.

Establishment:

- The larger seeded wheatgrasses were the easiest to seed and establish across the salinity gradient.
- The manystem wildrye was more difficult to establish, but showed good salinity tolerance.
- Switchgrass, creeping foxtail, and meadow brome appeared to be the most sensitive species to salinity.
- All of the alfalfa varieties/lines established similarly, but were not as saline tolerant as many of the grasses.

Harvest:

- Plots with adequate stands were harvested at the approximate stage for hay production for each species.
- EC readings were taken in plots the same day they were harvested for yield.
- The wheatgrasses and manystem wildrye continue to provide stable yields across the salinity gradient.
- The wheatgrasses tested (with the exception of tall), the bromegrasses, and the wildryes provided forage with adequate quality to maintain a dry or early gestation beef cow.

Forage analysis:

- Quality is consistent with what would be considered normal for each of the species.
- There is some indication that higher salinity levels impact quality similar to what one might expect from drought impacts.

Clipping for forage production at salinity study at Carrington, ND

The PMC also assisted in clipping several species of grasses for forage quality at a similar study near Parkston, SD. The PMC will continue to monitor and evaluate data from these sites and provide summary information in the future, including a final report at the conclusion of these studies.

Cover Crop Update

The Bismarck PMC is one of six Plant Materials Centers initiating a multi-state soil health study. The study consists of 40 plots comparing 20, 40 and 60 seeds per square foot seeding rates of 2, 4, and 6 species mixes. The following preliminary data and observations are from 2012, the first year of this multi-year study.

After 18 nightly lows of below freezing, cover crop is still green and respiring on 11/7/12 (97 days after seeding).

Biomass Production (dry matter/acre)

Species Mix	Seeds/ft^2	DM*/Acre
triticale, red clover	20	3488
	40	3457
	60	3873
triticale, red clover, hairy vetch, radish	20	3737
	40	3965
	60	4523
triticale, red clover, hairy vetch, radish, oats, rapeseed	20	4015
	40	4062
	60	4133

*DM=dry matter (pounds/acre)

2012 PMC Cover Crop Nutrient Data --
Wet Chemistry Analysis (dry matter basis)

Species	% Moisture	% Dry Matter	% Crude Protein	% ADF	% NDF	% Crude Fiber
hairy vetch	8.57	91.43	30.36	23.9	33.6	19.08
radish	13.83	86.12	27.9	19.2	20.5	15.33
peas	13.55	86.45	18.23	26.6	31.7	21.27
rape	13.35	86.65	30.6	14.5	14.5	11.62
red clover	9.1	90.1	29.53	20.6	30.6	16.52
triticale/oats	14.58	85.42	22.86	24.6	47.9	16.65

Cover crop seeded 8/2/2012 and sampled 9/21/2012; field peas were more mature due to May 2012 planting in a separate cover crop mix.

Field Plantings

Mongolian Scots pine (left), Meyer's spruce (center), and lodgepole pine (right) are available in 2014.