TECHNICAL NOTE

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EVALUATION OF PERENNIAL GRASSES USED IN CROSS WIND TRAP STRIPS IN EASTERN IDAHO

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Rush Intermediate wheatgrass cross wind trap strip

Evaluation of Perennial Grasses use in Cross Wind Trap Strips in Eastern Idaho

INTRODUCTION

Wind erosion on cropland can be a serious problem in some areas of eastern Idaho (Figure 1). Transportation of loose, erosive soils on cropland can damage or reduce soil quality and crop productivity. Other negative impacts include degraded water quantity and quality, air quality, and soil biological activity. Cross wind trap strips (Conservation Practice Standard 603) are strips of herbaceous cover resistant to wind erosion established in one or more strips across the prevailing wind direction. Cross wind trap strips can trap windborne sediment and reduce damage caused by erosion. They can also catch other pollutants such as nutrients and pesticides and prevent them from reaching water bodies or other sensitive areas.

This technical note summarizes the evaluation of a cross wind trap strip field planting of seven perennial grass varieties and highlights the benefits as well as management issues of cross wind trap strips.

Carl Ball of Hamer Farms in Hamer, Idaho has used Cross Wind traps strips under sprinkler irrigation for a number of years. He has used tall wheatgrass and basin wildrye in cross wind trap strips to control wind erosion on potato – small grain rotations. The strips are effective in keeping soil on the field for about two years before soil buildup in the cross wind trap strips causes the grasses to become buried and start to thin out. Typically he will maintain the cross wind trap strips for as many as five years.

Figure 1. Example of soil-buried fence row

Cross wind trap strips are established at Hamer Farms at the same time potatoes are planted. This allows for the grasses to establish and the cross wind trap strips to begin to function in the fall after potato harvest when very little residue is left on the field. The cross wind trap strips are planted in 12 foot strips approximately 180 feet apart. The cropping distance between the cross wind trap strips works well for planting and harvesting potatoes and also is acceptable for pesticide application. The cross wind trap strips do add extra work for field activities as far as application of pesticides, harvesting and tillage activities, while working around the cross wind trap strips. With the advent of global positioning systems (GPS) field marking for the cross wind trap strips is much simpler. With prevailing winds from the southwest, the approximate unsheltered distance between strips is 255 feet if strips are planted in a north-south orientation.

Although cross wind traps strips are affective in keeping wind-borne soil on the field, they periodically must be removed to redistribute soil and level the field. Depending on how high the soil drifts are in the cross wind trap strip, disks or road graders are used to break down the drifts and redistribute the soil (Figure 2).

A costly issue for Hamer Farms was infestation of a grain crop with ergot that was probably introduced into one of his fields from infected tall wheatgrass used in a cross wind trap strip. Ergot is a fungus that grows on the florets of rye and related grasses. Ergot produces alkaloids that can cause circulation and neurological problems in humans and other mammals. If ergot is found in a grain crop, it can prevent the sale of the grain. The grain that was infected with ergot had to be cleaned several additional times to remove the ergot before it could be sold.

Other issues with cross wind trap strips include spread of the grass into the cropping area, weed control within the grass strips, and spray drift from treating potatoes with herbicides to control grassy weeds. Gaps in the cross wind trap strips can also occur if grasses do not establish. Irrigation of crops can also affect establishment and growth of the grass if too much water is applied to negatively affect grass growth.

Figure 2. Faint remnant of grass strip hump in field

In 2009, Hamer Farms contacted J. Howard Johnson, NRCS District Conservationist in the Rigby, Idaho Field Office to discuss the possibility of evaluating other grasses that could be used in cross wind trap strips. A field planting was planned and installed with technical assistance and grass seed provided by the NRCS Plant Materials Program.

BACKGROUND INFORMATION ON FIELD PLANTING

The field used for the study is under center pivot sprinkler irrigation with a wheat – potato crop rotation in MLRA 11(Snake River Plains). The soils are classified as Corassy Butte Loamy Sand, 2-4 percent slope with a southwest aspect at 4800 feet elevation. Soil pH is 6.6-8.4 and the soils are highly erodible by wind. The purpose of the field planting was to evaluate the performance of tall grass species in cross wind trap strips with special emphasis on finding grass species that have the best ability to regrow up through drifting sand.

FIELD PLANTING PLANNING AND INSTALLATION

A planting plan was developed and submitted to the Idaho/Utah Plant Materials Specialist who provided additional input to the plan and then contacted plant materials centers to provide seed of 'Rush' and 'Manifest' intermediate wheatgrass, 'Bozoisky' and 'Mankota' Russian wildrye, 'Luna' pubescent wheatgrass and 'Alkar' and 'Largo' tall wheatgrass. Ten strips were marked out in the field approximately 180 feet apart running north and south and the seed was planted with a 12 foot wide Brillion drill with six inch row spacing in June 2009 into a clean, firm seedbed. Figure 3 is an aerial photograph of the field and shows the layout of the cross wind trap strips. The seeding rate was approximately ten pounds PLS/ac for all strips. The strips were irrigated along with the crops growing in the field.

EVALUATION

The field planting was evaluated on September 24, 2010 (near the end of the second growing season of the cross wind trap strips). The data is summarized as follows:

Variety	Stand	Density (Plt/ft$^{2)}$	Vigor	Height (inches)	Plant injury	Weed infestation	Yield (Tons/ac)	Erosion control
Rush	Excellent	4	Excellent	68	None	None	5	Excellent
Manifest	Fair	4	Fair	50	Drifting	None	2	Fair
Luna	Excellent	4	Excellent	53	Drifting	None	3	Good
Bozoisky	Excellent	6	Fair	20	Irrigation	Light	1	Poor
Mankota	Excellent	6	Fair	20	Irrigation	Light	1	Poor
Alkar	Good	5	Excellent	68	None	Light	4	Good
Largo	Excellent	3	Excellent	72	Drifting	None	5	Excellent

Rush intermediate wheatgrass produced an excellent stand and was rated excellent for use in cross wind trap strips (cover photograph). Manifest intermediate wheatgrass (Figure 4) produced good stands but was not as vigorous. Heavy sand drifting also affected the Manifest stand and ergot was present in the seed heads (Figure 5). Bozoisky (Figure 6) and Mankota Russian wildrye produced very thick, short stands and were not very well suited for cross wind trap strips. Russian wildrye has a very vigorous root system and crowding it into tight row spacing will inhibit its growth. Irrigation of the field crops may have been excessive for this species also. Alkar (Figure 7) and Largo (Figure 8) tall wheatgrass also had excellent height and density but sand drifting was beginning to affect the plants. Luna pubescent wheatgrass (Figure 9) had good

height and stand density for erosion control but the stand was spotty, also had ergot, and was being affected by sand drifting. The cross wind trap strips were removed in the spring of 2013.

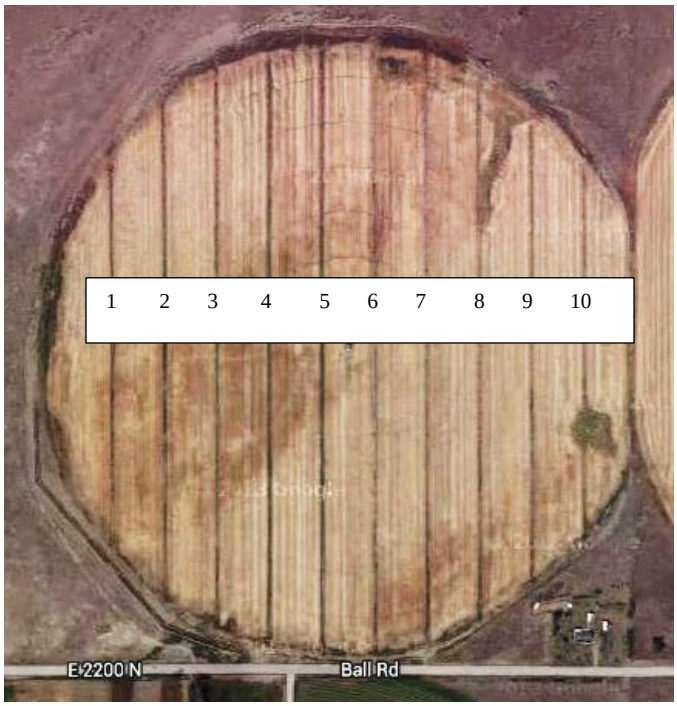

Figure 3. Cross Wind Trap Field Planting, Hamer Farms

Row Number	Grass Variety
1 and 2	Rush intermediate wheatgrass
3	Bozoisky Russian wildrye
4	Mankota Russian wildrye
5	Alkar tall wheatgrass
6	Largo tall wheatgrass
7 and 8	Manifest intermediate wheatgrass
9 and 10	Luna pubescent wheatgrass

CONCLUSIONS

Based on the evaluation of this field planting, Rush intermediate wheatgrass and Largo tall wheatgrass provided the best erosion control followed by Alkar tall wheatgrass and Luna pubescent wheatgrass. Manifest intermediate wheatgrass had only fair erosion control. Intermediate and pubescent wheatgrass are mildly rhizomatous and sod-forming and will spread more readily into the cropping area. The Russian wildrye varieties Bozoisky and Mankota are not well suited for cross wind trap strips because the bulk of plant growth is basal and they only had fair vigor, likely due to excessive irrigation for the species. Tall wheatgrass and Russian wildrye are bunch grasses which are less likely to creep into the cropping area. The only other tall perennial grass that could be used in cross wind trap strips in eastern Idaho is basin wildrye but it is highly susceptible to ergot.

Cross wind traps strips can be used in the NRCS Wind Erosion Prediction System (WEPS) to adjust for un-sheltered distance. Greater un-sheltered distance results in predicted higher rates of

wind erosion and conversely, smaller un-sheltered distance results in predicted lower rates of wind erosion. Cross wind trap strips are an effective conservation practice to keep blowing soil on a field but are not a permanent solution to control wind erosion and have management issues that must fit into a farming operation.

Figure 4 Manifest intermediate wheatgrass

Figure 5 Manifest intermediate wheatgrass with ergot

Figure 6 Bozoisky Russian wildrye

Figure 7 Alkar tall wheatgrass

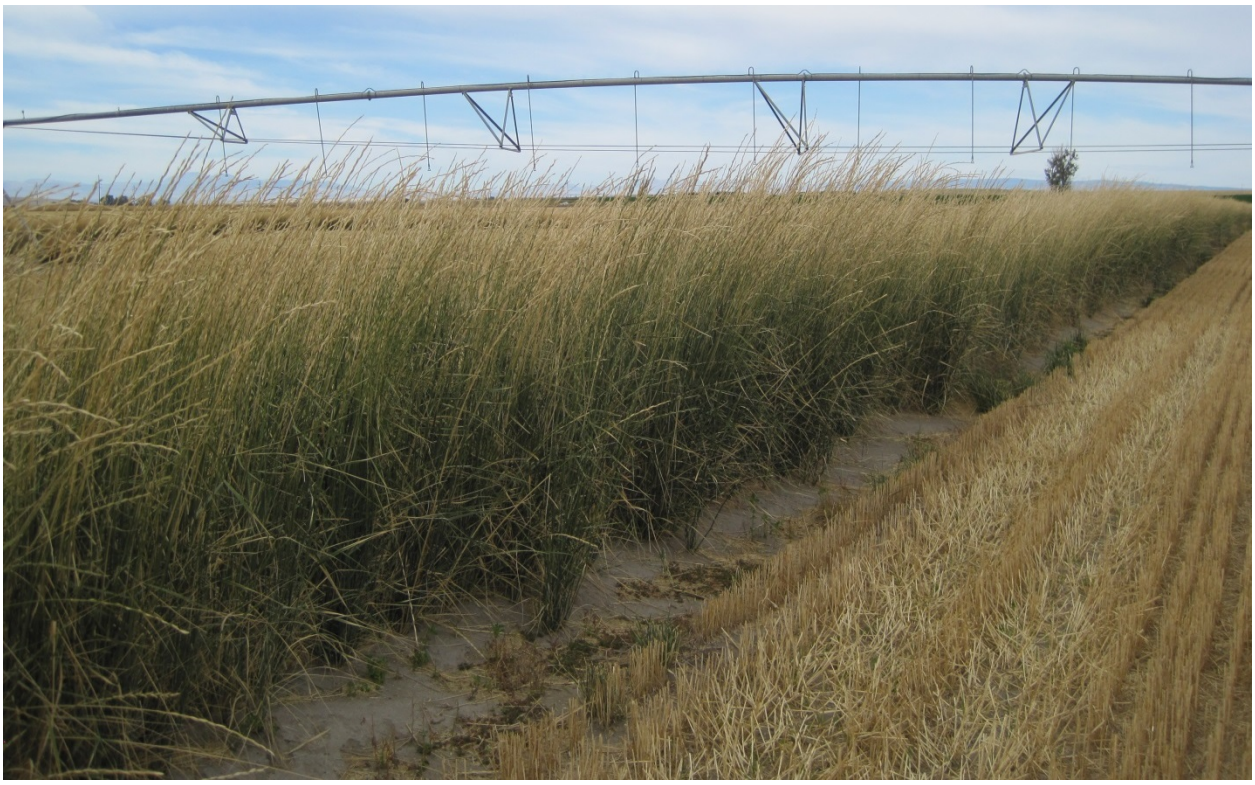

Figure 8 Largo tall wheatgrass

Figure 9 Luna pubescent wheatgrass