PROGRESS REPORT

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TALL WHEATGRASS SNOW BARRIERS BOOSTS CONTINUOUSLY CROPPED FORAGE YIELDS

B. W. Greb[1]

INTRODUCTION

Growing forage crops annually between narrow parallel strips of perennial tall wheatgrass barriers offers a much higher yield potential than forage crops grown without barriers. The name of the game is to trap snow between these grass strips to feed the cropping area that might otherwise blow off (see Fig. 1). This system shows good promise in an area from Highway I-70 north where snowfall averages more than 25 inches per winter season.

Since 1959, researchers at Akron have evaluated various vegetative barriers for snow control and water conservation and have decided the crop residue stubble of sudangrass, sorghum, and corn is not as practical as tall wheatgrass since these crops require annual installation during the middle of fallow seasons.

Trees and bushes are not good barriers for adjacent crops because they take years to establish and sap soil water for distances up to four times their height.

METHODS

Highlights regarding tall wheat grass snow barriers at Akron are as follows:

Establishment and Maintenance

1. Plant barrier strips in narrow double rows (12 to 18 inches) oriented east-west early in May during fallow season. Keep new planting weed free until autumn. The grass plants will grow rapidly the second summer to provide snow catchment the second winter and thereafter.
2. The crop-target snow deposit between parallel strips can vary from 30 to 50 feet. We chose 37 feet to fit 12-foot-wide machinery.
3. The grass stalks should not be cut but allowed to grow to three to five feet in height.
4. Periodically spray or cultivate weeds.
5. Use 30-35 lb/acre nitrogen application prior to planting forages when grown on an annual basis.
6. Consider fallowing crop area between barriers about every fourth or fifth year if drought threatens the health of the barriers.

Advantages of Barriers

1. Have perennial value instead of annual installation.
2. Wind speeds are reduced leeward (crop area) 80, 60, 40, and 30 percent at distances of 2, 5, 8, and 11 times the height of the barrier. Barriers do more than deposit snow. Crops and soils are also protected from drying winds and wind erosion.
3. Functions best for sizable storms exceeding 4 inches snowfall and 12 percent water content driven by moderate to high wind speeds. The Akron area averages one storm per season of this type (see Table 1).
4. Increased the supply of available water on crop-target area by three inches snow water and two inches soil water per winter season (Table 1).
5. Increased target area dry forage yields of rye, wheat, hay millet, and sudangrass by 40+ percent compared with non-barrier systems (Tables 2, 3). This includes subtracting 10 percent of the target area yield because of the land area occupied and affected by the barrier strips.

Disadvantages of Barrier Strips

1. All tillage is fixed in a given direction. On long downhill slopes this may increase water erosion.
2. Grass strips require regular weed control maintenance.
3. Root competition of barriers extends to about 1½ feet each side of barrier.
4. Snow deposit favors the north half of the target area which often results in uneven height of forage crop being grown.

SUMMARY

Grass barriers offer an alternative for obtaining higher yields of forage to ranchers who plant some livestock feed crops every year. Barriers can also be used for quick farmstead protection, and also as a medium for windbreak establishment (more snowmelt to feed young trees).

[1]*Soil Scientist, USDA-SEA, Colorado-Wyoming Area, in cooperation with the Colorado State University Experiment Station.*

Recent Literature

Black, A. L. and F. H. Siddoway. 1971. Tall wheatgrass barriers for soil erosion control and water conservation. J. Soil & Water Cons. 26: 107-111.

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Greb, B. W. 1975. Snowfall characteristics and snowmelt storage at Akron, Colorado. Symposium Proc. Snow Management in the Great Plains. Great Plains Council Pub. No. 73, p. 45-64.

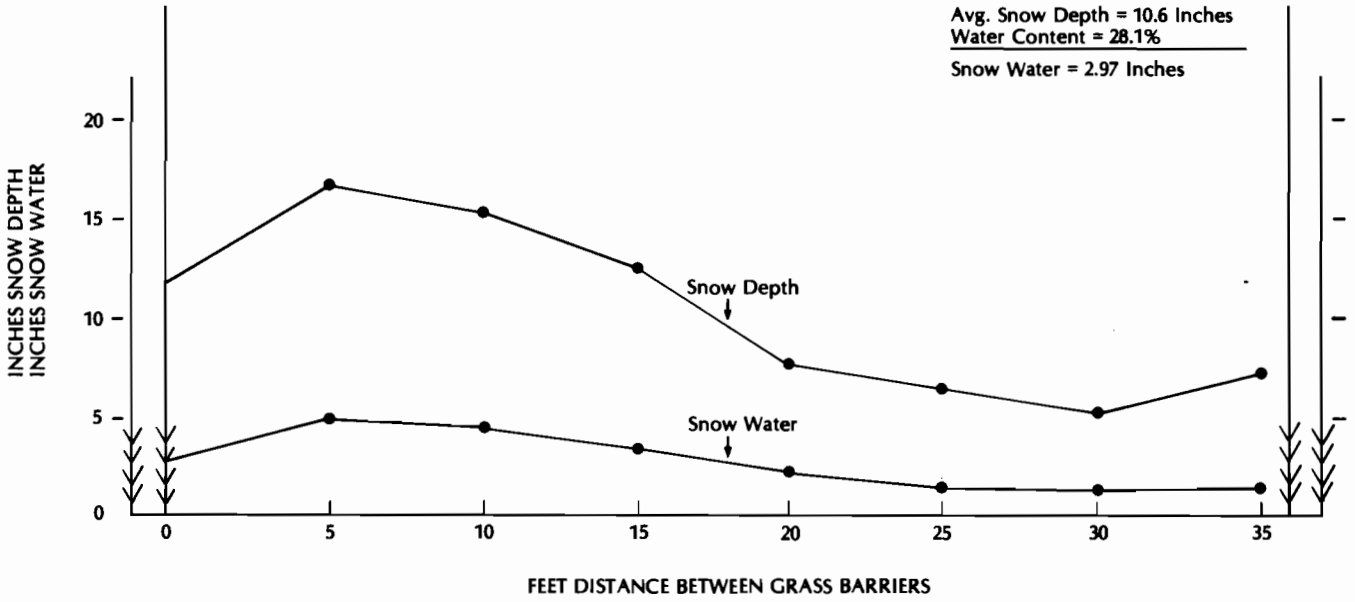

Fig. 1 — Snow depth profile between tall wheat grass barriers resulting from one major snowstorm per season. Four-year average (1974-1977).

Table 1. Significant snowstorms contributing snowmelt leeward of tall wheat grass barriers. Colo. A-72-5.

Winter Season	Date Storm	Snowmelt Deposit, Feet Leeward 0-12	12-24	24-36	Avg. Deposit	Snowmelt Soil Gain	Snowmelt Eff.
		Inches Water					%
1973-74	Dec. 18, 24	2.80	2.00	1.35	2.05	0.95	46
1974-75	Mar. 27	3.88	2.55	1.30	2.58	1.85	72
1975-76	Nov. 20	5.50	3.25	1.75	3.50	2.25	64
1976-77	Mar. 10	4.82	3.59	2.81	3.74	2.68	71
Avg.		4.25	2.85	1.80	2.97	1.93	65
Percent of Total		48	32	20			

Table 2. Average yield of all forage crops[1] by years involving tall wheatgrass snow barriers versus no barrier and fallow.

Crop Year	Yield No Barrier Cont. Cropping	Snowmelt Water	Yield Snow Barrier Cont. Cropping[2]	Yield Gain Barrier Area	Snowmelt Yield Eff.	Yield No Barrier Fallow-Crop[3]
	Lb/A	Inches	Lb/A	Lb/A	Lb/A/In.	Lb/A
1974	2,480	0.95	2,840	360	380	4,570
1975	2,975	1.85	3,595	620	335	5,490
1976	2,100	2.25	3,710	1,610	715	4,020
1977	2,365	2.68	4,035	1,670	625	5,245
Avg.	2,480	1.93	3,545	1,065	550	4,830

[1]Combined dry matter yield of winter rye, winter wheat, sudangrass and hay millet.
[2]Yields reduced 10 percent to compensate for land area occupied by grass barriers.
[3]One crop per two years; avg. annual yield = 2,415 Lb/A.

Table 3. Four year average (1974-1977) yield of individual forage crop with and without tall wheatgrass snow barriers.

Crop Type[1]	Yield No Barriers Cont. Cropping	Yield Grass Barriers Cont. Cropping[2]	Yield No Barriers Fallow-Crop
	Lb/A/Dry Forage		
Winter Rye	2,840	3,940	5,140
Winter Wheat	2,300	3,490	5,100
Hay Millet	2,610	3,610	4,845
Sudangrass	2,125	3,135	4,230

[1]Varieties included Tetra Pectus rye, Centurk wheat, Leonard millet, and Piper sudan.
[2]Yields reduced 10 percent to compensate for land area occupied by grass barriers.