TECHNICAL NOTES

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LATE FALL SEEDED COVER CROP TRIALS

Mark Stannard and Edward Branchaw
Pullman Plant Materials Center, Pullman, Washington

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Introduction

Low residue crops which are harvested late in the fall provide little soil protection during winter and early spring. Fall seeded cover crops can dramatically reduce wind erosion if they develop adequate growth in the fall and early spring to protect the soil. One hundred small grain cultivars were initially screened for cold tolerance in 1994-1995 at Pullman. All the cultivars were selected from northern origins in the hope that they would exhibit cold tolerance. Some of the cultivars came from as far away as Alaska and Finland. Plots were seeded September 15 and October 1, 1994, and emergence and growth were rated through mid-April, 1995. This initial screening enabled us to narrow our focus on types with cover crop potential. A more refined study was established in the fall of 1995

Study Description

Two sites were selected in central Washington for the 1995-1996 study. The first site was located near George on a Quincy sand soil (I = 310, Water Holding Cap. 0.09"/inch). The previous crop, potatoes, was harvested a few days prior to planting the cover crop study. The second site was located at the Lind Dryland Experiment Station on a Shano silt loam soil (I=56, Water Holding Cap. 0.23"/inch). The previous crop was barley. Sixteen cultivars were seeded at the George site on October 11, 1995 using a Hege 90 plot drill with 8-inch row spacing. Seeding rates were 80 LB/acre for the small grains, 98 LB/acre for the peas, and 18 LB/acre for the turnip. Seeding depth was 1.5-inches with the exception of the turnip which was seeded at 0.5-inch. The field was sprinkle irrigated the following day. The same 16 cultivars plus 'Moro' winter wheat were seeded at Lind on October 12, 1995 using the same drill. Both sites were pre-irrigated. Each cultivar plot was 6'x 20' and replicated three times at each site. Growth data were collected during the fall and spring. A portion of each plot was clipped on 4/10/96 and 5/9/96 at George and Lind, respectively to estimate biomass production.

Cultivars Seeded at George and Lind, WA

'Celia'	Winter Triticale	**'Grey'**	Winter Oats
'Centurk'	Winter Wheat	**'Hoody'**	Winter Barley
'Common'	Austrian Winter Pea	**'Stephens'**	Winter Wheat
'Alpowa'	Spring Wheat	**'Norstar'**	Winter Wheat
'Breaker'	Winter Triticale	**'Nugaines'**	Winter Wheat
'Dusty'	Winter Wheat	**'Penawawa'**	Winter Wheat
'Granger'	Austrian Winter Pea	**'Tyfon'**	Turnip
'Parma'	Winter Triticale	**'Yamhill'**	Winter Wheat
'Moro'	Winter Wheat		

Results

Excellent stands were obtained within two weeks after planting. None of the cultivars developed more than two leaves prior to the onset of winter. Since leaf numbers were minimal going into the winter, stand density, winter-hardiness, leaf length, and rapid spring recovery were critical factors for protecting the soil.

Daytime temperatures rarely exceeded 75 degrees F in the fall following seeding, and night-time freezing temperatures occurred within 2 weeks following planting which slowed growth of the plants. Wind events were minimal through the duration of the study, and no visible wind damage was observed on the plants. Sub-zero temperatures occurred for several days in January and snow cover was marginal at this time.

'Stephens' winter wheat was used as our standard for comparisons. Very few cultivars demonstrated significantly better soil protection attributes than 'Stephens'. Its upright, narrow canopy was characteristic of all the winter wheats evaluated in this trial. The upright growth form (stature) protects the soil by keeping the wind energy above the soil surface. However, narrow canopies offer little wind energy reduction when winds are moving parallel to the rows.

Several older winter wheat cultivars were evaluated in this trial. We hypothesized that the older, taller statured winter wheats would produce more leaf material in the fall and early spring. No significant differences in leaf production were noticed in this trial between the older winter wheats and 'Stephens' winter wheat.

'Nugaines', an old semi-dwarf variety, performed very well in the 1994-95 initial screening. We switched to a different seed source for 'Nugaines' in 1995 because it was contaminated with goatgrass seed. Unfortunately, the different seed failed to emerge and was later found to be totally nonviable.

The two hard red winter wheats, 'Centurk' and 'Norstar', exhibited very thick stands but the plants were noticeably shorter than the white winter wheats. Because of their short stature, these two cultivars do not appear to be good candidates for wind erosion protection during the fall and winter months. Spring growth on 'Centurk' and 'Norstar' was excellent, and they offered excellent early-mid spring cover.

'Tyfon' turnip was seeded quite heavy and a solid stand was obtained. It failed to survive the winter and the dead tissue offered minimal soil. Neither of the two Austrian winter peas provided consistent stands, and neither provided adequate ground cover to protect the soil. Soil crusting severely inhibited seedling emergence at the Lind site.

'Alpowa' spring wheat exhibited excellent emergence, growth, and winter-hardiness, although it did not persist through the winter following fall grazing in a separate study. 'Grey' oats and 'Hoody' winter barley exhibited chlorotic spots in the fall at George which might be attributed to residual metribuzin injury. 'Hoody' winter barley outgrew the injury and provided very good early spring cover. 'Grey' winter oats still exhibited some chlorosis in the spring and spring growth was much slower than the other winter grains.

The triticales tended to be less upright than the winter wheats but leaf lengths were comparable. Ground cover percentages were generally high which can be attributed to the characteristic decumbent growth of triticales. 'Breaker' winter triticale, a new Oregon State University release, exhibited outstanding vigor and ground cover. Its leaves were approximately 50% wider than the other triticales tested. 'Breaker' is said to reach 7-feet in height when mature.

Conclusions

'Alpowa' spring wheat might be an option for fall cover crop plantings. However, other spring wheat cultivars did not perform similarily in the earlier trial which would indicate that 'Alpowa' is distinctly different in terms of winter hardiness.

Austrian winter peas and 'Tyfon' turnip need ample growing degree days in the fall to produce adequate amounts of biomass to protect the soil during the winter months. They do not appear to be good candidates for late fall plantings.

The winter triticales generally offered slightly better ground cover during the wind erosion periods of the Columbia Basin than the winter wheats. Spring biomass production was generally higher for the triticales than 'Stephens' winter wheat with 'Breaker' providing the highest amounts. Winter triticales are quite cold tolerant which make them excellent candidates for late fall seedings. They offer an added degree of security for late fall cover crop seedings. The cold tolerance benefit may be less noticeable for early fall seedings, and high seed cost might make triticales less acceptable to producers. If the triticales are to be accepted by producers, this species will need to provide benefits beyond protecting the soil from wind erosion. Additional research is scheduled to evaluate the forage value and excess nitrate uptake potential of the triticales.

Cooperators

Robert Gillespie, WSU Cooperative Extension Service
Dave Hammond, Hammond Farms
Harold Crose, USDA-NRCS, Ephrata Field Office
Bruce Sauer, WSU Lind Experiment Station
Bill Pan, Dept. Crop & Soil Sci.

LATE FALL SEEDED COVER CROP TRIAL RESULTS PLANTED OCT. 11 & 12, 1995 AT GEORGE AND LIND, WA, RESPECTIVELY.

VARIETY		FALL STAND COUNTS*		SPRING GROUND COVER **		SPRING BIOMASS PROD ***	
		GEORGE	LIND	GEORGE	LIND	GEORGE	LIND
		(no./3ft of row)		(%)		(LB/acre)	
'Stephens'	Winter Wheat	30	26	81	83	316	3221
'Celia'	Winter Triticale	37	27	88	82	310	4066
'Centurk'	Winter Wheat	40	16	88	87	394	3190
'Common'	Aust Winter Pea	13	5	27	37	77	538
'Alpowa'	Spring Wheat	33	27	86	88	437	4265
'Breaker'	Winter Triticale	26	28	93	93	531	5307
'Dusty'	Winter Wheat	27	8	72	75	157	1258
'Granger'	Aust Winter Pea	17	6	23	45	60	444
'Parma'	Winter Triticale	27	21	87	87	439	4737
'Grey'	Winter Oats	33	6	23	28	34	548
'Hoody'	Winter Barley	32	33	73	80	159	3368
'Norstar'	Winter Wheat	44	31	78	83	254	1876
'Nugaines'	Winter Wheat	0	0	0	0	0	0
'Penawawa'	Spring Wheat	31	25	38	65	145	1478
'Tyfon'	Turnip	91	56	0	0	0	0
'Yamhill'	Winter Wheat	27	11	78	80	188	2837
'Moro'	Winter Wheat	--	30	--	88	0	3165
LSD .05		14.7	8.8	13.4	8.8	135.2	1047.8

* Rated 11-8-95

** Rated 4-3-96 at Lind, 4-8-96 at George

*** Clipped 4-10-96 at George, 5-9-96 at Lind