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PROJECT TITLE: EVALUATION OF NO-TILL RECROP SPRING WHEAT, BARLEY, AND TRITICALE VARIETY PERFORMANCE OFF-STATION IN NORTHERN MONTANA

PROJECT LEADER: R. Berg, Havre, MT

PROJECT PERSONNEL: T. Blake, Coordinator - Barley
L. Talbert, Coordinator - Spring Wheat
D. Spicher, Cooperating Landowner

OBJECTIVES: To evaluate spring grain varieties regarding suitability for production under no-till conditions in northern Montana.

SUMMARY:

Three spring grain nurseries evaluated 12, 14, and 10 varieties of barley, wheat, and triticale near Hingham, MT in 1989. Differences between varieties giving the maximum and minimum responses for plant height, tiller production, grain yield, and test weight were observed in each nursery, except for spring wheat grain yields. Test weight for barley and triticale was similar to the standard weight commonly reported for these commodities but was slightly lighter for the spring wheats. Each nursery had one or two varieties that weighed at least 5 lb/bu lighter than their standard test weight (MT 81161 and Busch 1202, barley; MT 8182, spring wheat; and Marvel, triticale) and Sunland triticale averaged nearly 4 lb/bu heavier. Triticale varieties produced fewer tillers than the Newana spring wheat control and all were taller except for the Karl variety.

RESULTS:

The average barley was 18 in tall, produced 14 tillers/ft, and yielded 13 bu/ac of grain with 45 lb/bu test weight, 16 % protein, and had 53 % plump and 25 % thin kernels (Table 1). Harrington was among the taller barleys (22.9 in) and Steptoe the shorter (13.7 in). Busch Agr 1202 and MT 81161 had test weights that were at least 5 lb/bu lighter than the 48 lb/bu standard test weight for barley. The highest and lowest yielding varieties were Bowman and Gallatin at 21 and 8 bu/ac, respectively.

Spring wheats averaged 22 in tall, produced 16 tillers/ft, and also yielded 13 bu/ac of grain with 57 lb/bu test weight and 18 % protein (Table 2). Amidon and MT 8402 were examples of tall and short varieties in this trial (27.8 and 19.4 in, respectively). The hard white variety MT 8182, produced grain with the lightest test weight (54 lb/bu). All other spring

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wheats were lighter that the standard test weight by 1 to 4 lb/bu. Grain yields were similar among varieties and ranged from 11 to 16 bu/ac.

Triticale averaged 28 in tall, produced 13 tillers/ft, and yielded 17 bu/ac of grain that had 50 lb/bu test weight and 16 % protein (Table 3). Newana was included in this nursery so performance of these varieties could be compared with other spring wheats. All triticale varieties were taller than Newana by 5 to 11 in except Karl. Marvel and Wapiti (32 in) were particularly tall, whereas Sunland, Juan, and Beagle were intermediate (27 in) but still taller than Karl (21 in). Triticale also produced fewer tillers than Newana (9 to 14 vs. 17 tillers/ft, respectively). Grain yields were similar to Newana, however, wide ranges within triticale varieties were observed. Wapiti and Beagle were the highest and lowest yielding varieties (26 vs. 14 bu/ac, respectively). As expected, all triticale had test weights that measured considerably less than Newana. Sunland was nearly 4 lb/bu heavier but Marvel and Welsh were 3 to 5 lb/bu lighter than the standard 50 lb/bu test weight.

FUTURE PLANS: Continued evaluation of variety performance with spring and winter cereal grains for no-till systems in northern Montana.

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TABLE 1. NO-TILL RECROP SPRING BARLEY VARIETY TRIAL. DARYL SPICHER FARM SOUTHWEST OF HINGHAM IN HILL COUNTY (S 1/2, SEC 28, T 32 N, R 10 E). NORTHERN AGRIC RESEARCH CENTER. HAVRE, MT. 1989.

VARIETY OR SELECTION	PLANT HEIGHT	TILLERS	GRAIN YIELD	TEST WEIGHT	PROTEIN	PLUMP	THIN
	in	no/ft	bu/ac	lb/bu	-------- % --------		
PI483237 Bowman	19.44	14.33	21.10	47.13	14.6	69.90	13.30
CI 9558 Piroline	19.50	17.50	18.00	46.20	17.2	46.30	25.80
SK 76333 Harrington	22.92	15.67	17.07	45.21	16.2	59.10	19.80
CI 15857 Clark	18.68	16.73	16.23	44.60	15.9	58.70	23.10
MT 81161 Lewis/Kgs/Smt	18.74	13.40	14.90	43.40	16.6	47.10	29.10
CI 15856 Lewis	20.20	12.43	12.93	46.61	15.9	57.70	21.30
MT140523 Hector/Klages	16.92	17.30	11.40	45.99	16.5	40.00	34.30
BA 1202 Busch Agr 1202	16.80	12.63	10.87	41.36	16.0	41.10	33.70
CI 15514 Hector	18.44	10.43	10.27	48.10	16.4	48.90	27.10
CI 15229 Steptoe	13.66	12.70	9.87	44.94	14.7	82.70	7.10
MT 81616 Bearpaw	18.26	12.43	9.13	44.95	17.1	40.30	36.00
PI491534 Gallatin	18.43	11.67	8.03	46.20	17.8	43.20	31.40
EXPERIMENTAL MEANS	18.50	13.94	13.32	45.40	16.2	52.92	25.17
F TEST FOR VAR.	2.24 #	0.97 ns	1.43 ns	2.27 #	na	na	na
C.V. 2: (S OF MEAN/MEAN)*100	7.96	17.08	25.66	2.73	---	---	---
LSD (0.05)	4.32	6.98	10.02	3.76	---	---	---

significant at 0.10 probability level (ns = not significant, na = not applicable)
Grain yield based on standard test weight of 48 lb/bu
Seeding Date: 5-20-89 Harvest Date: 9-07-89
Measured Soil Water Content: (Sampling Depth = 48 in)
@ Seeding: 7.6 in; @ Harvest: 5.1 in
Precipitation: 3-01-89 to Seeding: 3.90 in; Seeding to Harvest: 8.2 in
Soil Analysis: (0-6" except NO3 also @ 6-24 & 24-48" depths)
pH = 7.5, O.M.=1.2 %, NO3-N = 111 lb/ac, P = 29 ppm (Olsen),
K = 413 ppm, SO4-S = 11 ppm, Na = 0.07 meq/100 g,
E.C. = 0.6 mmho/cm, Zn = 0.6 ppm
Soil Series: Phillips loam; Previous Crop: Spring wheat
Fertilizer: 46-0-0 (74 lb N/ac deep banded at planting) and
11-52-0 (6 lb N/ac + 30 lb P205/ac banded with seed)
Herbicide: glyphosate & chlorsulfuron (@ 12 & 0.25 oz/ac, preplant);
2,4-D & metsulfuron (@ 12 & 0.1 oz/ac, postemerge)

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TABLE 2. NO-TILL RECROP SPRING WHEAT VARIETY TRIAL. DARYL SPICHER FARM SOUTHWEST OF HINGAHM IN HILL COUNTY (S 1/2, SEC 28, T 32 N, R 10 E). NORTHERN AGRIC. RESEARCH CENTER, HAVRE, MT. 1989.

VARIETY OR SELECTION	PLANT HEIGHT	TILLERS	GRAIN YIELD	TEST WEIGHT	PROTEIN
	in	no/ft	bu/ac	lb/bu	%
ND 606 Amidon	25.2	16.4	15.9	58.1	18.4
CANLANC Lancer	27.8	16.0	15.9	58.1	18.2
CI 17790 Len	19.7	15.1	15.2	57.2	17.9
CI 17430 Newana	22.3	16.0	14.9	57.9	18.3
CI 17828 Pondera	19.7	15.7	12.9	58.6	19.2
CI 13596 Fortuna	25.4	19.2	12.4	57.8	17.5
C982-324 Rambo	19.7	13.8	12.3	58.3	18.3
ND 582 Stoa	23.0	16.7	12.3	57.4	18.1
MT 8182 YDING "S"/PCI"	21.3	13.2	12.1	53.7	19.8
MT 8402 MT7336/Shortana	19.4	12.2	12.1	57.0	18.9
NDCUT Cutless	20.1	17.2	11.8	57.9	19.5
CI 17429 Lew	24.6	17.1	11.6	57.9	18.7
PI483235 Glenman	22.0	12.8	11.6	56.2	17.6
CI 17920 Marshall	19.8	16.9	10.6	56.0	16.7
EXPERIMENTAL MEANS	22.14	15.60	12.97	57.28	18.4
F TEST FOR VAR.	3.19 **	1.60 ns	0.76 ns	7.86 **	na
C.V. 2: (S OF MEAN/MEAN)*100	6.86	10.03	15.41	0.80	---
LSD (0.05)	4.41	4.55	5.81	1.33	---

** significant at 0.01 probability level (ns = not significant)
Grain yield based on test weight of 60 lb/bu
Seeding Date: 5-20-89 Harvest Date: 9-07-89
Measured Soil Water Content: (Sampling Depth = 48 in)
@ Seeding: 7.6 in; @ Harvest: 3.6 in
Precipitation: 3-01-89 to Seeding: 3.90 in; Seeding to Harvest: 8.2 in
Soil Analysis: (0-6" except NO3 also @ 6-24 & 24-48" depths)
pH = 7.5, O.M.=1.2 %, NO3-N = 111 lb/ac, P = 29 ppm (Olsen),
K = 413 ppm, SO4-S = 11 ppm, Na = 0.07 meq/100 g,
E.C. = 0.6 mmho/cm, Zn = 0.6 ppm
Soil Series: Phillips loam; Previous Crop: Spring wheat
Fertilizer: 46-0-0 (74 lb N/ac deep banded at planting) and
11-52-0 (6 lb N/ac + 30 lb P2O5/ac banded with seed)
Herbicide: glyphosate & chlorsulfuron (@ 12 & 0.25 oz/ac, preplant);
2,4-D & metsulfuron (@ 12 & 0.1 oz/ac, postemerge)

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TABLE 3. NO-TILL RECROP SPRING TRITICALE VARIETY TRIAL . DARYL SPICHER FARM SOUTHWEST OF HINGHAM IN HILL COUNTY (S 1/2, SEC 28, T 32 N R 10 E). NORTHERN AGRIC. RESEARCH CENTER. HAVRE, MT. 1989.

VARIETY OR SELECTION	PLANT HEIGHT	TILLERS	GRAIN YIELD	TEST WEIGHT	PROTEIN	GRAIN WEIGHT
	in	no/ft	bu/ac	lb/bu	%	cwt/ac
Wapiti	31.86	14.38	25.62	50.05	16.0	12.80
Sunland	26.65	11.02	20.65	53.73	14.9	10.30
Newana	21.99	17.37	17.55	58.45	17.3	9.95
Kramer	28.08	13.73	16.45	49.88	15.6	8.20
Marvel	33.11	11.38	16.35	44.80	16.0	8.18
Carman	29.46	12.03	15.95	49.53	15.7	7.95
Welsh	30.50	13.45	15.50	47.40	16.6	7.73
Karl	21.21	12.93	14.95	49.53	15.5	7.48
Juan	27.20	9.07	14.53	49.88	16.4	7.25
Beagle 82	27.03	11.43	13.68	49.18	17.3	6.85
EXPERIMENTAL MEANS	27.71	12.68	17.12	50.24	16.1	8.67
F TEST FOR VAR.	11.82	** 5.08	** 1.86 #	61.85 **	na	2.15 #
C.V. 2:	4.05	7.92	15.19	0.92	---	14.36
LSD (0.05)	3.26	2.91	7.55	1.35	---	3.61

**, # significant at 0.01 and 0.10 probability levels
(ns = not significant, na = not applicable)
Grain yield (bu/ac) based on test weight of 50 lb/bu (Newana = 60 lb/bu)
Seeding Date: 5-20-89 Harvest Date: 9-07-89
Measured Soil Water Content: (Sampling Depth = 48 in)
@ Seeding: 7.6 in; @ Harvest: 3.6 in
Precipitation: 3-01-89 to Seeding: 3.9 in; Seeding to Harvest: 8.2 in
Soil Analysis: (0-6 in except NO3 0-6, 6-24, & 24-48 in depths)
pH = 7.5, O.M.=1.2 %, NO3-N = 111 lb/ac, P = 29 ppm (Olsen),
K = 413 ppm, SO4-S = 11 ppm, Na = 0.07 meq/100 g,
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11-52-0 (6 lb N/ac + 30 lb P2O5/ac banded with seed)
Herbicide: glyphosate & chlorsulfuron (@ 12 & 0.25 oz/ac, preplant);
2,4-D & metsulfuron (@ 12 & 0.1 oz/ac, postemerge)