PROJECT TITLE: Evaluation of Weed Management Input Variables in Delayed Seedings of Spring Barley.

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OBJECTIVES: Evaluate delayed seedbed preparation and planting dates in comparison to existing herbicide options for wild oat control in spring barley.

RESULTS:

Field investigations were initiated in 1990, and repeated in 1991, to evaluate delayed field cultivations and seeding as a weed management tool in comparison to existing herbicide options for wild oat control in spring barley. Also, the effectiveness of various herbicides was to be tested with each planting date initiated.

In the 1990 study three separate series of plots were cultivated and seeded 10 days apart (planting dates of 4/17, 4/27, and 5/7). An additional plot was included in the study that was cultivated at the first planting date (4/7), cultivated again in early May (May 7), and then planted. In each of the planting date plots six herbicides treatments were sprayed at the proper stage of growth. The herbicide subplots consisted of the common broadleaf and/or wild oat herbicides listed below:

Trtmt	Chemical	Trade Name	Rate (# ai/A)	Appln
1.	Triallate	Fargo	1.25	PPI
2.	Triallate + (Thifensulfuron+ Tribenuron)	Fargo + Harmony Extra	1.25 .016	PPI POST
3.	Thifensulfuron+ Tribenuron	Harmony Extra	.016	POST
4.	Imazamethabenz	Assert	.375	POST
5.	Imazamethabenz+ (Thifensulfuron+ Tribenuron)	Assert + Harmony Extra	.375 .016	POST POST
6.	Untreated Check	----	----	----

Each planting date block (20' x 60') was seeded at 60 lbs/A of Gallatin spring barley with a research plot seeder. Herbicide treatments (10' x 20') were applied across the blocks using a research plot sprayer. An eighty square foot area was harvest from each subplot using a Hege plot combine. The planting date blocks were treated equally, fertilized according to field requirements, and harvested at maturity.

The 1991 investigation was similar to the 1990 Study except an extra planting date was added and time between plantings was expanded to fourteen days (planting dates of 4/3, 4/18, 5/3, and 5/17). Seedbed preparation/planting dates for both 1990 and 1991 are listed in Table 1.

1990 Results:

Yields and test weights of Gallatin spring barley did not differ among the three planting dates (4/17, 4/27 and 5/7). Wild oat numbers decreased with later planting dates (7.6 plants per square foot on 4/17 to 2.2 plants on 5/7, Table 2). Post harvest barley plant numbers were not reduced, and tiller numbers increased, with later plantings in 1990 (Table 3 and 4). Broadleaf weed pressure was greatest in the earlier plantings. Delayed cultivation and seeding of spring barley caused a decrease in wild oat populations and increased the effectiveness of the wild oat herbicide imazamethabenz in later plantings (Table 5).

1991 Results:

Yields were not reduced in the first (4/3), third (5/3) and fourth (5/17) planting dates but were significantly less in the second planting date (4/18) due to high wild oat pressure and cooler weather during seedling establishment (Table 6). Plots not receiving wild oat herbicide applications (Thifensulfuron + tribenuron or the Untreated Check) had significantly reduced yields and test weights, regardless of the planting date (Table 7). As noted in 1990, the wild oat populations were highest in the earliest plantings (4/3 and 4/18) and decreased dramatically in the later plantings (3.6 wild oat plants/sq ft on 4/3 and .2/sq ft on 5/17, Table 2). Post harvest barley plant numbers did not decrease with later planting dates but tillers per plant did decrease the later planting was delayed in the spring (Table 3 and 4). Broadleaf weed pressure was constant throughout all planting dates in 1991. Noted again this year was that delayed cultivation and seeding of spring barley reduced wild oat numbers and increased the effectiveness of the wild oat herbicides triallate and imazamethabenz (Table 8).

SUMMARY: Data from the 1990 and 1991 Input Analysis Studies suggest that seedbed preparation may be used effectively as a weed management tool in spring barley and that delayed seedbed preparation and planting can lessen wild oat populations significantly as well as enhance the effectiveness of certain wild oat herbicides. Historically, later seedings of spring barley produce fewer tillers with resultant lower yields. Due to unusually cool, wet June weather in both 1990 and 1991 these tests were not subjected to that factor of yield reduction. This study, performed in a "normal" growing season would most likely show yield differences across the planting dates.

FUTURE PLANS: Evaluation of input variables in small grains production will be continued in 1992.

TABLE 1. Seedbed Prep/Planting Dates Input Analysis Study

	1990	1991
Date 1	4/17	4/3
Date 2	4/27	4/18
Date 3	5/7	5/3
Date 4	Cult'd 4/17, 5/7 Seeded 5/7	5/17
Date 5	----	Cult'd 4/3,5/17 Seeded 5/17

TABLE 2. Wild Oat Plants/ SQ. FT. For Planting Dates.

	1990	1991
Date 1	7.6	3.6
Date 2	2.9	8.1
Date 3	1.8	.6
Date 4	2.2	1.0
Date 5	----	.2
LSD	4.37	5.96

TABLE 3. Barley Plants / SQ. FT. For Planting Dates.

	1990	1991
Date 1	9.1	10.2
Date 2	9.4	10.6
Date 3	9.2	9.3
Date 4	9.7	9.9
Date 5	----	10.5
LSD	NS	.956

TABLE 4. Tillers / SQ. FT.
For Planting Dates.

	1990	1991
Date 1	35.3	46.8
Date 2	37.7	45.4
Date 3	42.5	40.6
Date 4	43.0	39.9
Date 5	----	40.4
LSD	4.12	4.86

TABLE 5. Percent Wild Oat Control 1990
Input Analysis Study

Trtmt	Date 1	Date 2	Date 3	Date 4	MEAN
Triallate	82.1	92.2	72.4	96.1	85.1
Imazameth	61.1	95.5	100	100	88.9
MEAN	71.6	93.9	86.2	98.1	

LSD for Trtmts 11.86 LSD for Date = 12.96

TABLE 6. Yield Bu/Acre Input Analysis

	1990	1991
Date 1	75.3	83.0
Date 2	78.8	66.4
Date 3	80.9	78.2
Date 4	81.7	76.3
Date 5	----	80.7
LSD	NS	7.47

TABLE 7. Yield, test weights and percent plumps averaged for all planting dates. Input Analysis Study, 1990 and 1991.

Treatment	YIELD		TEST WEIGHT		% PLUMP	
	1990	1991	1990	1991	1990	1991
Triallate	89.0	76.4	48.8	50.0	95.6	81.8
Triallate + (Thifen.+Trib)	85.6	86.6	47.8	50.7	93.8	83.0
Thifensul + Trib.	63.3	65.9	43.4	49.5	84.6	79.6
Imazamethabenz	84.2	83.6	47.5	50.4	94.1	86.0
Imazamehabenz+ (Thifen+Trib)	85.2	86.2	47.8	50.6	93.8	83.8
Check	67.8	63.0	44.8	49.5	87.7	82.1
LSD	6.53	9.21	1.12	.921	2.50	3.65

TABLE 8. Percent Wild Oat Control 1991
Input Analysis Study

Trtmt	Date 1	Date 2	Date 3	Date 4	Date 5	MEAN
Triallate	87.0	71.8	93.5	86.8	95.0	86.8
Imazameth	79.0	72.3	100	97.3	98.8	89.5
MEAN	83.0	72.1	96.8	92.1	96.9	

LSD for Trtmts 5.60 LSD for Date = 5.63

HERBICIDES USED IN SMALL GRAINS STUDIES - 1991

Common Name	Trade Name
Triallate	Fargo
Thifensulfuron + Tribenuron	Harmony Extra
Tribenuron	Express
2,4-D	2,4-D ester
Bromoxynil/MCPA	Bronate
Diclofop	Hoelon
Fenoxaprop	Puma (or Tiller)
Imazamethabenz	Assert