WILD PROSO MILLET CONTROL IN SWEET CORN

Project Leaders: K.L. Petersen, R.B. McReynolds, R.D. William and Bill Braunworth

Grower Cooperator: Ray Bartosz

Introduction

Wild proso millet infests about 4,000 acres in the Willamette Valley. This represents an approximate doubling of infested acreage from 1985. Currently registered herbicides for sweet corn provide erractic results. Research evidence suggests that leaching conditions may reduce the concentration of certain herbicides at the soil surface where the growing point of wild proso millet develops. Additionally, wild proso millet resists soil-applied applications of atrazine. Efficacy data are required to verify the results obtained last year involving 3 trials where tridiphane provided acceptable control of millet when combined with atrazine between late preemergence and early postemergence (before 3-leaf stage).

Results

Early preemergence trial (Table 1). Visual ratings 2-3 weeks after treatment indicated that alachlor, metolachlor, cycloate + alachlor, and cycloate + pendimethalin all provided excellent control. However, control began to weaken unless an early postemergence herbicide was applied (such as alachlor or pendimethalin) two weeks after the first application. These preemergence herbicides caused slight leaf scorch on the corn. Other early preemergence herbicides, cycloate + antidote and vernolate provided only moderate and poor control, respectively.

Oversprayed late preemergence - early postemergence trial (Table 2). Due to changing personnel, this trial was inadvertently oversprayed. However, since only moderate to poor residual control was observed from treatments 2-11 in table 1, it follows that the atrazine + tridiphane, pendimethalin, and pendimethalin + atrazine + tridiphane treatments provided the excellent weed control ratings in table 2. The oversprayed treatments were applied late preemergence to early postemergence (1 to 2 leaf stage) of the wild proso millet.

The pendimethalin + atrazine + tridiphane treatment caused stunting to the corn. Another oddity observed in this trial was the occurrance of leaf twisting and stunting symptoms of the corn resembling thiocarbamate injury in certain treatments. This occurred where higher amounts of thiocarbamate or pendimethalin were applied with a high amount (at least 1.0 lb ai/A) of tridiphane.

Postemergence trial (Table 3). Atrazine + tridiphane at the 2 to 4 leaf stage of wild proso millet provided moderate control, except where pendimethalin was applied at 1 + 1 lb ai/A early and late postemergence. Sethoxydim applied as a directed spray at the 6 to 8 leaf state of the wild proso millet provided excellent control, but excessive corn injury occurred. Slight crop injury occurred where pendimethalin was applied with tridiphane.

Late postemergence trial (Table 4). Atrazine + tridiphane applied at the 4 to 7 leaf stage of wild proso millet provided similar to slightly poorer control when compared to the previous experiment. The addition of pendimethalin at early and late postemergence was also slightly less effective. Again, slight crop injury was noted where pendimethalin was applied with tridiphane.

Late postemergence treatments of sethoxydim (Table 5). Low rates of sethoxydim applied with oil as broadcast and directed sprays gave no control of wild proso millet. At the time of application the wild proso millet was 2 to 2.5 feet tall with several tillers. This trial should show success if the low rate treatments are applied at the same time as the sethoxydim was in trials 3 and 4.

Summary

Excellent residual control of wild proso millet in sweet corn was realized with atrazine + tridiphane (2 + 0.5 and 2 + 0.75) and pendimethalin (2) applied late preemergence. These are probably the most economical choices. Excellent residual control was also achieved with preemergence application of cycloate + alachlor (4 + 2) plus early postemergence alachlor (2); and preemergence cycloate + pendimethalin (4 + 1) plus early postemergence pendimethalin (1). Alachlor (4) and metolachlor (3) provide excellent initial control (for 2 to 3 weeks), but need a later application of alachlor (2) or pendimethalin (1) to get season-long control. Sethoxydim (0.25) without crop oil as a directed spray gave excellent control, but corn injury was 20 to 40%.

More research is needed with other combinations of herbicides. It has not been possible in mid-western states to rely on one or two herbicides for wild proso millet control. Some other herbicides which could be explored further in Oregon are eradicane, cyanazine, ametryn, sethoxydim, and combinations of these with herbicides already being researched in Oregon.

Table 1. Preemergence control of wild proso millet in sweet corn.

Pre and early postemergence treatments	Rate (lb ai/A)	Visual ratings: Wild proso millet[1/] Rated: 7-18	8-22	Corn[2/] 7-18
1. Control	---	0	0	0
2. Vernolate [a/]	8	7	1	0
3. Cycloate [a/]	4	6	3	0
4. Cycloate + antidote [a/c/]	2	5	1	0
5. Cycloate + antidote [a/]	4	7	4	0
6. Cycloate + antidote [a/]	6	8	5	0
7. Cycloate + antidote [a/]	8	8.5	7	0
8. Alachlor [a/]	4	9.9	7	0
9. Metolachlor [a/]	3	9.6	5	0
10. Control	---	0	0	0
11. Tridiphane [a/]	0.75	7	1	0
12. Cycloate + alachlor [a/]	4 + 4	10	9	0
13. Cycloate + alachlor +alachlor (Early Post)[b/]	4 + 2 2	10	9.4	0.5[d/]
14. Cycloate + pendimethalin +pendimethalin (Early Post)[b/]	4 + 1 1	9.8	9.6	0.2[d/]
15. Vernolate [a/]	4	4	1	0
16. Vernolate [a/]	4	6	1	0

1/ 0 = no control 10 = complete control

2/ 0 = no injury 10 = corn completely killed

a/ Preemergence treatments applied 7/3

b/ Early postemergence treatments applied 7/15

c/ Cycloate + antidote is Marathon

d/ Leaves were scorched with small spots/not exceeding 5% of leaf area

Table 2. Late preemergence - early postemergence (1 to 2 leaf stage) Control of wild proso millet in sweet corn (oversprayed trial).

Preemergence and late postemergence treatments	Rate (lb ai/A)	Oversprayed preemergence-early postemergence[c/] treatments	Rate (lb ai/A)	Visual ratings (7/18) wild proso millet	corn
1. Control	---	Control	---	0	0
2. Butylate [a/]	4	Atrazine	1	6	0
3. Cycloate [a/]	4	Atrazine + tridiphane	1 + 0.5	8	0*
4. Cycloate + antidote[a/ d/]	2	Atrazine + tridiphane	1 + 0.75	9	0**
5. Cycloate + antidote [a/]	4	Atrazine + tridiphane	1 + 1	9.2	0**
6. Cycloate + antidote [a/]	6	Atrazine	2	9.4	0
7. Cycloate + antidote [a/]	8	Atrazine + tridiphane	2 + 0.5	9.8	0.1*
8. Alachlor [a/]	4	Atrazine + tridiphane	2 + 0.75	9.9	0.6*
9. Metolachlor [a/]	3	Atrazine + tridiphane	2 + 1	9.9	0*
10. Butylate + tridiphane [a/]	4 + 0.75	Pendimethalin	2	10	0
11. Tridiphane [a/]	0.75	Pendimethalin + atrazine + tridiphane	2 + 1 + 0.75	9.6	3 (stunting)
12. Cycloate [a/]	4	Pendimethalin + atrazine + tridiphane	1 + 1 + 0.75	9.9	2*
13. Cycloate + alachlor + alachlor (late post)[b/]	4 + 2 +2	-----	-----	9	0.2
14. Cycloate + pendimethalin + pendimethalin [a/]	4 + 1 +1	-----	-----	8	0

a/ Preemergence treatments applied 6/13

b/ Late postemergence treatments applied 7/15

c/ Oversprayed treatments applied 6/24

* Denotes some twisting of lower corn leaves and stunting, observed primarily in first replication where lack of agitation occurred when applying atrazine with tridiphane.

d/ Cycloate + antidote is Marathon

Table 3. Postemergence control of wild proso millet at 2 to 4 leaf stage in sweet corn.

Postemergence treatments	Rate (lb ai/A)	Visual ratings (7/23) wild proso millet	corn
1. Control	---	0	0
2. Atrazine a/	1	0	0
3. Atrazine + tridiphane a/	1 + 0.5	3	0
4. Atrazine + tridiphane a/	1 + 0.75	4	0
5. Atrazine + tridiphane a/	1 + 1	5	0
6. Atrazine a/	2	1	0
7. Atrazine + tridiphane a/	2 + 0.5	6	0
8. Atrazine + tridiphane a/	2 + 0.75	7	0
9. Atrazine + tridiphane a/	2 + 1	5	1 d/
10. Pendimethalin a/	2	5	0.1 d/
11. Pendimethalin + atrazine + tridiphane a/	2 + 1 + 0.75	6	2 d/
12. Pendimethalin + atrazine + tridiphane a/ + pendimethalin (late post) ab/	1 + 1 + 0.75 + 1	8	1 d/
13. Sethoxydim ac/	0.25	9.7	2
14. Fluazifop-p + concep II ac/	0.12	9.8	9.7
15. Fluazifop-p + concep II ac/	0.25	10	10

a/ Postemergence treatments applied 6/30

ab/ Late postemergence treatment applied 7/15

ac/ Directed/shielded sethoxydim and broadcast fluazifop-p with concep II seed treatment applied 7/7

d/ Twisted lower leaves

Table 4. Late postemergence control of wild proso millet at 4 to 7 leaf stage in sweet corn.

Late postemergence treatment[a/]	Rate (lb ai/A)	Visual ratings (7/23) wild proso millet	corn
1. Control	---	0	0
2. Atrazine	1	1	0
3. Atrazine + tridiphane	1 + 0.5	4	0
4. Atrazine + tridiphane	1 + 0.75	3	0
5. Atrazine + tridiphane	1 + 1	4	0
6. Atrazine	2	0.2	0
7. Atrazine + tridiphane	2 + 0.5	3	0
8. Atrazine + tridiphane	2 + 0.75	6	0.1[b/]
9. Atrazine + tridiphane	2 + 1	6	0
10. Pendimethalin	2	4	0
11. Pendimethalin + atrazine + tridiphane	2 + 1 + 0.75	7	1.5[c/]
12. Control	---	0	0
13. Sethoxydim	0.25	9	4
14. Fluazifop-p + concep II	0.12	5	9.1
15. Fluazifop-p + concep II	0.25	8.5	10

a/ Late postemergence treatments applied 7/7. Sethoxydim and fluazifop applied at 7/7 also, and in same manner as table 3.

b/ Twisted lower leaves

c/ Scorch spots on leaves, stunting

Table 5. Late postemergence control of wild proso millet at 2 to 2.5 feet tall stage (several tillers) with broadcast and directed sprays of sethoxydim in sweet corn.

Late postemergence treatment[a/]	Rate (lb ai/A)	Visual ratings (10/2) wild proso millet	corn
1. Control	---	0	0
2. Sethoxydim + crop oil 1% (broadcast spray)	0.05	0	0
3. Sethoxydim + crop oil 1% (directed spray)	0.05	0	0
4. Sethoxydim + crop oil 1% (broadcast spray)	0.075	1	0
5. Sethoxydim + crop oil 1% (directed spray)	0.075	1	0
6. Sethoxydim + crop oil 1% (directed spray	0.10	1	0

a/ Late postemergence treatments applied 7/29. Corn was 2.5 to 3 feet tall.