

*Final Report on the 2010 Survey of Weed Management
Practices in Wisconsin's Atrazine Prohibition Areas*



Wisconsin Department of Agriculture, Trade and Consumer Protection

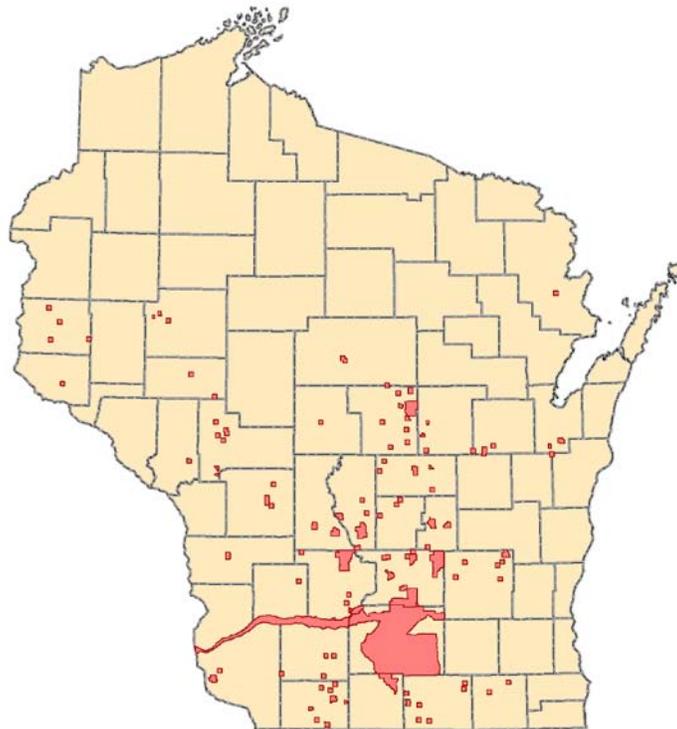
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Background

Since 1990 the Department of Agriculture, Trade and Consumer Protection has established 101 prohibition areas (PAs) in Wisconsin where the herbicide atrazine cannot be used. These atrazine prohibition areas were established in areas where drinking water wells were found to be contaminated with atrazine at levels above the health standard of 3 parts per billion. DATCP is required to take these actions under the Wisconsin Groundwater Law (ch. 160 of the Wisconsin Statutes). Depending on the number of contaminated wells involved, the prohibition areas range in size from about 500 acres to more than 500,000 acres. The total number of acres in prohibition areas in the state is about 1.2 million.

Figure 1. Map of Atrazine Prohibition Areas in Wisconsin.



Purpose

The main purpose of this survey was to evaluate differences in herbicide use and other weed control practices inside and outside of Wisconsin's atrazine prohibition areas. A specific objective was to determine whether simazine, a triazine herbicide that is similar to atrazine, is used more extensively inside prohibition areas since atrazine is prohibited. Simazine metabolites (breakdown products) have been found in groundwater in some PAs so we wanted to know if this could become a bigger water quality problem. We also wanted to gather information on how prohibiting the use of atrazine affects the ability to grow corn.

Methods

Survey Design

The target population for this survey was farmers within atrazine PAs and the target sample size was 100 farmers. The PA in Dane County contains 531,863 acres and makes up 48 percent of the total land area in PAs. In order to accurately represent the Dane County prohibition area, it was allotted 40 samples. The remaining samples in the rest of the PAs were selected using a systematic random sampling procedure based on the number of acres within the PAs.

Using the above procedure, several PAs had multiple samples selected. These areas were divided into subplots equal to the number of samples selected from each PA. The subplots were approximately equal in area and were divided using road boundaries where possible.

Specific farmers were selected in the sampled areas through the use of another random procedure. USDA National Agricultural Statistics Service (NASS) data collection representatives were instructed to start on the northernmost east-to-west road inside the sampled area. The representatives were then told to stop at every farm operation they came to until they found a farmer who had a corn field inside the PA. If the farmer agreed to participate in the survey, he or she was added to the sample. This method resulted in a final sample size of 102 farmers.

Sample Collection and Analysis

The study was divided into two separate data collection activities. The first part included the collection of data for a supplemental questionnaire containing fourteen questions about weed management in PAs. The second part included the collection of detailed chemical application data and other production practices in conjunction with NASS's Agriculture Resource Management Corn Production Practices and Cost Report (CPPCR).

The data from the supplemental questionnaire and the CPPCR were summarized separately. CPPCR data from farmers in the PAs was compared to data from farmers who were not in PAs.

Results and Discussion

Each of the 102 corn growers in the survey was asked a series of questions about weed control in atrazine PAs. The purpose of these questions was to determine the impact that PAs have had on corn production and how farmers have adapted to growing corn in a PA.

If atrazine were legal to use in PAs, would you use it?

Forty-one percent of respondents indicated they would use atrazine again, 33 percent said they would not use it, and 25 percent said they did not know. These results suggest that many corn growers still want to have atrazine as a weed-control option.

Is it more difficult to grow corn without atrazine?

To determine if it is more difficult to grow corn in a PA, a series of questions was included in the survey for the subset of corn growers who grew corn both inside and outside of a PA. Thirty-eight out of the 102 respondents were in this category. This subset of respondents who have experience growing corn both inside and outside a PA is unique not only in Wisconsin but in the U.S.

The first question in this series asks whether it is more difficult to control weeds inside a PA versus outside a PA. Table 1 shows the results for this question. Half of the respondents indicated that it is “not more difficult”, 32 percent said it is “somewhat more difficult” and about 8 percent said it is “much more difficult” to control weeds inside a PA.

Table 1. Responses to the question “How much more difficult is it to control weeds inside a PA versus outside a PA?”

<i>Response</i>	<i>Number and percent of respondents</i>
Not more difficult	19 (50%)
Somewhat more difficult	12 (32%)
Much more difficult	3 (7.9%)
Don't know	4 (10.5%)

The next question addressed the costs of controlling weeds in a PA. Table 2 shows the responses to this question. It is noteworthy that an equal number of respondents answered “yes” and “no” for this question. It would be an interesting topic for a future survey to find out why some corn growers experience added costs inside a PA while

others do not. For the 15 respondents who answered “yes”, the average increase in cost per acre was \$13.60 with a range from \$5 to \$25. Although this cost information is valuable, it is only based on 15 responses.

Table 2. Responses to the question “Does it cost more to control weeds on your corn acres inside a PA than on your corn acres outside a PA?”

<i>Response</i>	<i>Number and percent of respondents</i>
Yes	15 (39%)
No	15 (39%)
Don’t know	8 (21%)

The last question in this series asked if there were any reductions in corn yields inside a PA. Table 3 shows the results for this question. Two out of 35 respondents reported a reduction in corn yield in a PA and both these respondents indicated a loss in the 11-15 bushels per acre range.

Table 3. Responses to the question “During the past three years, has the prohibition of atrazine in the PA caused a reduction of your corn yield when compared to your fields outside the PA?”

<i>Response</i>	<i>Number and percent of respondents</i>
Yes	2 (5%)
No	32 (84%)
Don’t know	4 (11%)

How difficult is it to determine if an herbicide product contains atrazine?

Many herbicide products contain atrazine but it is not always easy to determine this from the product name. Because of this it is possible that a corn grower could inadvertently apply atrazine in a PA. The results in Table 4 indicate that most operators do not find it difficult to determine if an herbicide product contains atrazine.

Table 4. Responses to the question “How difficult is it to determine if an herbicide product contains atrazine?”

<i>Response</i>	<i>Number and percent of respondents</i>
Not difficult	80 (78%)
Somewhat difficult	9 (9%)
Very difficult	1 (1%)
Don’t know	12 (12%)

What alternative herbicides to atrazine are used in PAs?

The respondents were asked which herbicides they have used as alternatives to atrazine in PAs in the past three years. The active ingredients contained in those products are listed in Table 5. Four respondents reported using a product containing atrazine in a PA, perhaps indicating that they did not realize that the product contained atrazine.

Table 5. Responses to the question “In terms of the number of corn acres applied to in the PA, what are the top three herbicides you used in the past three years as alternatives to atrazine?”

<i>Herbicide Active Ingredients</i>	<i>Number of Responses</i>
Glyphosate	92
s-Metolachlor	22
Mesotrione	21
Acetochlor	19
Dicamba	10
Clopyralid	10
Flumetsulam	10
2,4-D	6
Tembotrione	4
Diflufenzopyr	4
Atrazine	4
Simazine	2

How important is it to have a triazine herbicide available?

Some weed control specialists have stated that it is important to have at least one triazine herbicide available for weed control programs. The responses to this question show that 47 percent of respondents feel it is somewhat important or very important to have a triazine herbicide available. A slightly lower percentage (42%) of respondents do not feel it is important to have a triazine herbicide available.

Table 6. Responses to the question “How important is it to have a triazine (atrazine or simazine) herbicide available for weed control in corn?”

<i>Response</i>	<i>Number and percent of responses</i>
Not important	43 (42%)
Somewhat important	23 (23%)
Very important	24 (24%)
Don't know	11 (12%)

Changes in field management practices in PAs

This question attempted to determine if farmers in PAs have changed their field practices in response to not being able to use atrazine. Table 7 shows that a number of practices have been changed or added to control weeds. Respondents could choose all practices that applied.

Table 7. Responses to the question: “Have you changed or added any of the following field practices on your corn acres inside a PA to control weeds?”

<i>Practice</i>	<i>Number of “Yes” Responses</i>
Tillage	37
Cultivation	16
Scouting	48
Crop Rotation	47
Increased number of trips across field	25

Do you think PAs have helped to improve water quality in the PAs?

Of the 102 respondents, 45 percent answered “yes” to this question, 12 percent answered no and 43 percent did not know. In response to the results from this question, DATCP will attempt to find ways to make the results of follow-up well sampling in PAs available to interested parties.

Comparison of herbicide use inside and outside of PAs

One of the main objectives of this survey was to determine if herbicide use is different in PAs compared to the rest of the state. Table 8 compares herbicide use data (percent of corn acres used on and application rate) inside and outside PAs for six herbicides that were frequently reported as alternatives to atrazine in this survey. (There was not enough

reported simazine use inside or outside PAs to generate these statistics.) These results show that in general the use of these six herbicides was similar inside and outside of the PAs. Mesotrione and acetochlor were used somewhat more frequently outside PAs and acetochlor was applied at a higher rate outside PAs. Flumetsulam was used at a higher rate inside PAs.

Table 8. Comparison of selected herbicide use inside and outside of PAs in 2010.

<i>Herbicide</i>	<i>Area applied inside PAs (percent)</i>	<i>Area applied outside PAs (percent)</i>	<i>Rate per crop year inside PAs (lbs/acre)</i>	<i>Rate per crop year outside PAs (lbs/acre)</i>
Glyphosate	48	51	1.08	0.97
S-Metolachlor	24	26	1.34	1.39
Clopyralid	23	25	0.14	0.12
Acetochlor	19	26	1.49	1.78
Mesotrione	20	27	0.12	0.13
Flumetsulam	23	25	0.053	0.043
Simazine*	--	--	--	--

* not enough use to report

Summary

The results of this survey suggest that although many corn growers would like the option to use atrazine in PAs, they have adapted well to growing corn without it. Half of the respondents indicated that they do not find it more difficult to control weeds in a PA without atrazine. Only about 8 percent of respondents indicated that it is much more difficult to control weeds in a PA and another 32 percent said it is somewhat more difficult.

Corn growers appear to be split on the question of whether it costs more to control weeds in a PA with 39 percent responding "yes" and 39 percent "no". The 39 percent that said it costs more reported an average cost increase of \$13.60 per acre. Only 5 percent of the corn growers surveyed indicated that they had experienced a yield reduction in a PA.

By far the most common alternative to atrazine in PAs was glyphosate-containing products like Roundup. A comparison of the use of six commonly-used herbicides inside versus outside of PAs showed only minor differences. It was not possible to determine if simazine is used more inside PAs due to low reported use both inside and outside of PAs.

How the data will be used

We will use the results of this survey to 1) determine whether we need to focus more attention on simazine use in prohibition areas and 2) determine the economic and other impacts of our atrazine regulations. We will also share the results with other interested parties such as the University of Wisconsin Department of Agronomy and the U.S. Environmental Protection Agency.

Appendix A. Responses to the open-ended question “What do you think about PAs and growing corn inside PAs?”

Each respondent was asked the open-ended question “What do you think about PAs and growing corn in PAs?” The following are the unedited responses to this question.

- Other products also work, no need to change.
- Spray cost more inside the PA than outside of it.
- If its (atrazine) getting into well water, we can do without it.
- Not very much.
- I think that some farms used too much atrazine.
- Didn't use atrazine before so it doesn't make any difference. It's good to have PAs.
- Didn't think much of it.
- Other products available instead of atrazine.
- Didn't have to battle weeds that badly when we could use atrazine - it had residual effect.
- Don't know, already a PA when I started farming.
- A rule we had to follow.
- Advantage.
- More Expensive, More work.
- Round-up better. More weed control.
- I would like to see a cheaper herbicide.
- Doesn't make a difference to me.
- Haven't thought about it.
- I am happy with results using products I use.
- I haven't used atrazine so I can just guess that there is a good reason not to use it.
- Too busy to worry about it.
- Don't have a problem with restricted area as long as other herbicides on market provide weed control without carry over, will not need atrazine products.
- Too busy to answer.
- Don't want atrazine in water either.
- I don't know what difference it makes.
- Good idea.
- Work around it.

- Doesn't make any difference. It would be nice to know what the atrazine levels are and if they changed since PA came.
- Not a problem if atrazine is not abused by grower.
- Lot easier without the atrazine because he says he can direct seed his alfalfa which you can't do for two years if you use atrazine.
- We treat everything the same.
- In PA you can grow fall winter wheat or rye which is harvested early and can be a form of weed control and it gives you another crop in the same field. I need the corn so I don't grow soybeans. You have to make silage to get the winter wheat in.
- Easy to control weeds without atrazine. Not needed.
- Atrazine was very effective. It has effected economically.
- It is alright as long as there is a good reason (health).
- Slightly more costly - Benefit about ground water quality.
- It's not fair - we're restricted and people nearby aren't.
- Any product used as long as atrazine is going to show up - too long of a shelf life.
- They should do away with PAs. So people could use anything, within reason.
- Doesn't matter, used herbicides other than atrazine before the PA.
- Real problem with giant ragweed. Goes back to products advertised nationally, that he finds he can't use- says he doesn't like to have all the tools in the toolbox not available to him.
- Should have no problems if used correctly (atrazine).
- Not very much, too many people over-used it.
- PAs should be eliminated.
- He feels monitoring both inside PAs and outside PAs should continue to see if groundwater levels of atrazine are diminishing. Results of the atrazine monitoring should be communicated with the farmers within the PA.
- Make do with it.
- Good idea to prohibit.
- As long as other herbicides do the job don't need atrazine.
- Glad atrazine not used in restricted areas.
- Helpful to health.
- I suspect that there was a good reason to ban atrazine.
- Should be able to use a small amount of atrazine to control weeds.
- Don't care.
- More Costly - last 4 years its been easier since Roundup - but I need to change my herbicide program soon and I want there to be something else available.
- Restriction was a good idea.
- I know that it was cheap. I have never used it!
- Should keep restrictions on atrazine to keep family's health.
- Not a change except cost.
- As long as other herbicides do the job. There is not a need for atrazine.
- If it helps keep us healthier, I'm all for it.
- It raised the cost of production, been in a PA many years so don't think about it.
- Don't need atrazine.

- Don't need to use atrazine. There are other ways to control weeds. Atrazine is bad stuff.
- Not really a concern at this time.
- No difference between the two.
- Cost more in the PA.
- Don't think there is any problem with the PAs.
- He sells milk and his wells are tested regularly. He would rather that his land was not in a PA and he could use atrazine, but worries that others might not be careful and his water would get contaminated. He could not sell milk then.
- Area probably needs to be retested to see if there is still a concern. He feels there might be no concern anymore.
- More study needed.
- Doesn't make any difference. Atrazine is nasty stuff and I wouldn't use it anyways.
- Haven't thought about it.
- Doesn't really influence his operation.
- If it's good for humanity, I am all for it.