BEAD OFFICIAL RECORD

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON D.C., 20460

September 26, 2005

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: Impacts Assessment for Fluometuron, D300562

FROM: Nicole Zinn, Biologist
Biological Analysis Branch

Stephen Smearman, Economist
Economic Analysis Branch
Biological and Economic Analysis Division (7503C)

THRU: Arnet Jones, Chief
Biological Analysis Branch 09/26/2005

David Widawsky, Chief
Economic Analysis Branch
Biological and Economic Analysis Division (7503C) 10/3/05

TO: Kylie Rothwell, Chemical Review Manager
Kimberly Nesci, Team Leader
Special Review and Reregistration Division

PEER REVIEW PANEL: July 20, 2005

SUMMARY

Fluometuron is registered to control annual grass and annual broadleaf weeds in cotton. This herbicide is primarily used in the southeastern region of the United States. Use of fluometuron has decreased with the rapid adoption of glyphosate-tolerant cotton. However, fluometuron is expected to be useful for weed resistance to glyphosate and weed shifts that occur as a result of widespread glyphosate use, as well as for those growers that are not growing glyphosate-tolerant cotton. No economic impacts from the loss of fluometuron are expected assuming that cotton growers are able to incorporate diuron or prometryn into their control regime which they are currently using. Mild impacts are expected if growers transition to newer control materials such as prometryn+trifloxysulfuron.

9/27/05

BACKGROUND

Fluometuron is a phenylurea herbicide registered for use on cotton. Risk assessments have been conducted for this herbicide and several risks of concern have been identified for human health (cancer dietary, chronic dietary), ecological and endangered species. In this document, BEAD has compiled use and usage information in order to refine the risk assessments, in addition to providing an alternatives analysis, and evaluating the niches and benefits of fluometuron, for the risk mitigation phase as part of the reregistration process.

USE AND USAGE

Fluometuron is registered for annual grass and annual broadleaf weed control in cotton. According to one Crop Profile, fluometuron provides excellent control of crabgrass, annual sedge, annual morningglory, pigweed, prickly sida; good control of barnyardgrass, broadleaf signalgrass, goosegrass, fall panicum, purslane, sicklepod; and fair control of Johnsongrass-seedling, cocklebur, and hemp sesbania, (USDA Crop Profile for Cotton in Mississippi, 2002).

Some of the weeds most commonly targeted by fluometuron are cocklebur, morningglory, redroot pigweed, prickly sida, sicklepod, and crabgrass (EPA Proprietary data). The National Cotton Council also lists horseweed, lambsquarters, and Palmer amaranth as target pests (National Cotton Council, 2004).

Fluometuron use has significantly declined since the adoption of glyphosate-tolerant cotton. Table 1 shows historical national and state-specific usage of fluometuron.

Table 1. Fluometuron Usage (Percent Area Applied) on Upland Cotton in the United States (1996-2001, 2003)*

State**	1996	1997	1998	1999	2000	2001	2003
AL	n/a	84	69	28	35	n/a	11
AR	91	65	59	61	43	21	17
GA	90	85	37	31	25	10	n/a
LA	63	75	81	60	46	23	11
MO	n/a	83	n/a	n/a	53	n/a	13
MS	92	88	82	74	45	17	12
NC	n/a	81	41	36	39	n/a	16
SC	n/a	84	n/a	n/a	n/a	n/a	25
TN	93	92	86	66	14	n/a	14
TX	7	10	9	7	4	n/a	3
U.S.	39	44	32	27	20	10	8

USDA NASS Agricultural Chemical Summaries
*Cotton was not surveyed in 2002.
**States with 5% or less of fluometuron applied were not included

Fluometuron is used to a lesser extent in the western cotton growing regions. There is no recorded fluometuron usage on cotton in California since 1994 (CAPIP data). In Arizona, 1 percent of the acreage was treated in 1998, and 3 percent in 2000 (USDA NASS).

Approximately 87 percent of fluometuron is applied before emergence of the cotton crop and 86 percent of fluometuron is applied at rates of 1 lb ai/acre or less (EPA proprietary data).

See Attachment 1 for additional usage data.

ALTERNATIVES ANALYSIS

At the SMART meeting on March 29, 2004, the registrants stated that prometryn, diuron, and glyphosate are alternatives to fluometuron (SMART, 2004). The National Cotton Council also mentioned pyriothiobac-sodium as an alternative (National Cotton Council, 2004). Extension specialists in Georgia and North Carolina believe that fluometuron will be useful as weed shifts and weed resistance occur from widespread glyphosate use (Culpepper, 2005; York, 2005a). In terms of herbicide use, weed resistance is when a weed that was once controlled by an herbicide is no longer controlled by the herbicide, whereas weed shifts occur when a weed is tolerant to an herbicide, is not adequately controlled, and becomes more prevalent in the system as the herbicide is used. Other herbicides are available for this situation, including diuron, prometryn, and pyrithiobac-sodium. These herbicides are the most likely alternatives although they have limitations. Diuron is an older chemical that does not offer the same level of weed control as fluometuron. Prometryn is not as effective as fluometuron as a preemergence application. Pyrithiobac-sodium is not as broad spectrum as fluometuron (Culpepper, 2005; York, 2005a). Information provided by the National Cotton Council indicates that prometryn is not as efficacious as fluometuron, and that there is a higher risk of crop injury with diuron (National Cotton Council, 2004). However, fluometuron has its own limitations, which include causing small amounts of crop injury (USDA Crop Profile for Cotton in Missouri, 2000). Trifloxysulfuron-sodium was recently registered for use on cotton, and a combination product consisting of prometryn + trifloxysulfuron is available. Trifloxysulfuron-sodium, applied post-emergence, controls many of the weeds targeted by fluometuron.

Table 3 illustrates the comparison between the cost of fluometuron and the listed alternatives above. The costs are based on the average total cost per acre herbicide treatment for cotton in 2004. The table also compares alternatives to fluometuron, indicating the expected overall control of primary target weed pests compared to fluometuron (i.e., less effective, same effectiveness, more effective) or other relevant factors.

Table 3. Comparison of the Costs of Alternatives to Fluometuron

Chemical Control	Alternative Compared to Fluometuron*	Average Total Cost Per Acre Treatment** $	Percent of US Cotton Acreage Treated**
Fluometuron		**7.60**	**8%**
Diuron	Similar effectiveness; higher risk of crop injury	3.70	28%
Glyphosate	Less effective on certain weed species, such as morningglory	7.70	69%
Prometryn	Less effective as pre-emergence; Similar effectiveness as post-emergence directed application	6.00	11%
Pyriothiobac-sodium	Not as broad spectrum	14.70	12%
Prometryn+trifloxysulfuron	May be more effective; applied post-emergence	13.20	***
Trifloxysulfuron-sodium	Applied post-emergence	8.50	***

* Effectiveness based on York, 2005b, discussions with extension specialists, or data provided by the National Cotton Council
**Costs based on EPA proprietary data and USDA NASS Agricultural Chemical Usage Field Crops Report 2003.
*** Percent Crop Treated data not available.

NICHE USES OF FLUOMETURON

Ultra-Narrow-Row (UNR) cotton is usually planted with glyphosate-tolerant varieties. One potential problem with this system could occur with glyphosate-tolerant soybean seeds that germinate and infest the cotton crop. Since glyphosate cannot be used to control volunteer glyphosate-tolerant soybeans, one USDA Crop Profile states that "The best solution for this problem is to apply a residual herbicide at planting in the cotton field that will kill the soybean. Fluometuron is the primary herbicide that could be used for this situation" (Crop Profile for Cotton in AL, 2001).

In addition, in the future, fluometuron may be useful as a different mode of action if resistance develops for certain weed species and for weed shifts. According to extension specialists in Georgia and North Carolina, as weed shifts and resistance occurs from widespread glyphosate use, fluometuron will be a valuable tool (Culpepper, 2005; York, 2005). The National Cotton Council also submitted data that showed fluometuron is important for areas with weeds shifts or weed resistance. These weeds include horseweed, morningglory, pigweed, Palmer amaranth, sicklepod, and others (National Cotton Council, 2004).

In terms of relative importance, morningglory is a very important weed controlled by fluometuron (National Cotton Council, 2004). Morningglories are a difficult weed for cotton growers and interfere with harvest. Fluometuron provides effective control of morningglory spp. (USDA Crop Profile for Texas, 1999; USDA Crop Profile for Cotton in Arkansas, 2000; USDA Crop Profile for Cotton in Mississippi, 2002).

BEAD believes that fluometuron is also still an important herbicide for growers that are not growing glyphosate-tolerant cotton.

ECONOMIC IMPACTS

Fluometuron is used primarily as a niche material to control volunteer glyphosate – tolerant soybeans, for control of morningglory and as a backup for pests that are glyphosate resistant. It is predominantly used in the Southeastern cotton producing States. Average farm size for Southern States that grow cotton average 269 acres per farm in the South. South Central US farm size is about 485 acres. This includes Texas which is the largest producer of upland cotton. Farm sizes range from about 145 acres (Tennessee) to 676 acres (Texas). Cotton is produced on about 35,000 farms or about 13 million acres annually.

Nationally, counties with the largest production and largest area are in the west (California and Arizona) and midwest (Texas). However, fluometuron is used almost exclusively in the South and Southeastern States. Texas for example with the largest average farm size and largest cotton production (approximately 5.6 million acres) has as an estimated 3% crop treated with fluometuron or around 160,000 acres, while South Carolina which has the highest percent crop treated with fluometuron (25% of 220,000 acres or about 55,000 acres) has an average farm size of 228 acres according to the American Farmland Trust. It is estimated that the majority of aerial applications occur on the larger acreage areas of the Southwest.

In 2003, an estimated 69% of the cotton crop was treated with glyphosate. Assuming that fluometuron is not available, the primary alternatives to fill the niche are diuron and prometryn. In 2003, the percent crop treated with diuron was estimated to be 28% and prometryn about 11%. Both cost less than fluometuron but are not as flexible in their use as fluometuron (See Table 3). Diuron is about one half the cost of fluometuron but has a higher risk of cotton crop injury. Prometryn is less effective as a pre-emergence use and has similar effectiveness as a post-emergence use. Table 1 illustrates the area applied of fluometuron and shows that fluometuron use has declined measurably since the introduction of Round-Up Ready Cotton. South Carolina is the largest user of fluometuron with 25% of the acreage in cotton treated with fluometuron, down from 84% in 1997. The percentage of cotton planted that is glyphosate resistant in South Carolina is approximately 93%. A newly registered product known as Suprend® (Prometryn+trifloxysulfuron) may be effective but not enough information is available to determine if it is an effective alternative.

Because South Carolina is the largest user of fluometuron (25 percent crop treated in 2003), South Carolina is a good representative to illustrate potential impacts. It is expected that if fluometuron use were cancelled that diuron or prometryn would replace it. If that is the case, there is no expected impact to cotton growers in South Carolina given the estimated costs and current use rates of the existing alternatives. However, if growers move to a newly registered product Suprend® (prometryn+trifloxysulfuron, about $13.20 per acre), the herbicide control costs would be expected to increase by about 15% (from $36.28 to $41.88) a net increase of $5.60 per acre. In terms of the impact to variable costs, costs would be expected to increase 1.2% on average. Fluometuron is used on about 55,000 acres and this translates into potential increased costs for South Carolina cotton growers of $308,000.

Nationally, an estimate of the potential impact for 8% of the 12.8 million acres treated with fluometuron is that grower costs may increase by up to $5.7 million if growers do not transition to diruon or prometryn. Otherwise no impact is expected due the lower costs of the alternatives.

CONCLUSIONS

Fluometuron is used to control annual grass and annual broadleaf weeds in cotton. This herbicide is primarily used in the Southeastern region of the United States. Use of fluometuron has decreased with the rapid adoption of glyphosate-tolerant cotton. However, fluometuron is expected to be useful for weed resistance and weed shifts that occur as a result of widespread glyphosate use, as well as for growers that do not grow glyphosate-tolerant cotton. No economic impacts from the loss of fluometuron are expected assuming that cotton growers are able to incorporate diuron or prometryn into their control regime which they are currently using. Mild impacts are expected if growers transition to newer control materials such as prometryn+trifloxysulfuron.

REFERENCES

California Pesticide Information Portal, California Department of Pesticide Regulation.

Culpepper, S, University of Georgia, May 19, 2004, Personal communication with Nicole Zinn.

National Cotton Council, August 24, 2004, Cotton Herbicide Product Profile: Typical Use Information.

SMART Meeting for Fluometuron, March 29, 2004.

USDA Crop Profile for Cotton in Arkansas, 2000, Web address: http://www.ipmcenters.org/cropprofiles/docs/Arcotton.html

USDA Crop Profile for Cotton in Alabama, Revised 2001, Web address: http://www.ipmcenters.org/cropprofiles/docs/alcotton.html

USDA Crop Profile for Cotton in Mississippi, 2002, Web address: http://www.ipmcenters.org/cropprofiles/docs/MScotton.html

USDA Crop Profile for Cotton in Missouri, 2000, Web address: http://www.ipmcenters.org/cropprofiles/docs/mocotton.html

USDA Crop Profile for Cotton in Texas, 1999, Web address: http://www.ipmcenters.org/cropprofiles/docs/txcotton.html

USDA NASS Agricultural Chemical Summaries

York, A., 2005a, Professor of Crop Science and Extension Specialist, North Carolina State University, May 26, 2005, Personal communication with Nicole Zinn.

York, A., 2005b, Chemical Weed Control in Cotton, 2005 North Carolina Agricultural Chemicals Manual, NC State University.

Attachment 1. Fluometuron Background Use Characteristics on Cotton

The majority of fluometuron is applied using ground based equipment. The US Cotton Council estimates that 80% of the applications are via ground application 20% aerial application. Recent BEAD proprietary data suggest almost all of the application is by ground based.

BEAD was asked to estimate the timing of fluometuron applications. The timing of applications based on crop cycles is presented below in Table 1 as a percent of the total cotton acres grown.

Table 1. Timing as a percent of the Total Cotton Acres Treated at Application time*.

Application Timing	Percent of Acres Treated
At Plant	57.4
Before Emergence	21.83
Early Post	1.97
Late Post	7.37
Before Emergence	87
After Emergence	13.5

*Source: BEAD proprietary data.

Rate distribution

Table 2 shows the rate distribution range for fluometuron based on .5 lb increments. Approximately 86% is applied at 1pound ai or less per acre and 14% of the acreage is treated with more than 1 pound ai per acre.

Table 2. Fluometuron Rate Distribution*

Pounds of Active Ingredient Rate Range	Cotton Total Area Treated	Percent of Total Area Treated
0.0-0.5	5,598,527	34
0.51-1.0	8,724,607	52
1.01-1.5	1,120,685	7
1.51-2.0	875,489	5
2.01-2.50	208,792	1
2.51-3.0	141,732	1

*Source: BEAD proprietary data.

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09/26/2005

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TO: Kylie Rothwell, Chemical Review Manager
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Because South Carolina is the largest user of fluometuron (25 percent crop treated in 2003), South Carolina is a good representative to illustrate potential impacts. It is expected that if fluometuron use were cancelled that diuron or prometryn would replace it. If that is the case, there is no expected impact to cotton growers in South Carolina given the estimated costs and current use rates of the existing alternatives. However, if growers move to a newly registered product Suprend® (prometryn+trifloxysulfuron, about $13.20 per acre), the herbicide control costs would be expected to increase by about 15% (from $36.28 to $41.88) a net increase of $5.60 per acre. In terms of the impact to variable costs, costs would be expected to increase 1.2% on average. Fluometuron is used on about 55,000 acres and this translates into potential increased costs for South Carolina cotton growers of $308,000.

Nationally, an estimate of the potential impact for 8% of the 12.8 million acres treated with fluometuron is that grower costs may increase by up to $5.7 million if growers do not transition to diuron or prometryn. Otherwise no impact is expected due the lower costs of the alternatives.

CONCLUSIONS

Fluometuron is used to control annual grass and annual broadleaf weeds in cotton. This herbicide is primarily used in the Southeastern region of the United States. Use of fluometuron has decreased with the rapid adoption of glyphosate-tolerant cotton. However, fluometuron is expected to be useful for weed resistance and weed shifts that occur as a result of widespread glyphosate use, as well as for growers that do not grow glyphosate-tolerant cotton. No economic impacts are expected assuming that cotton growers are able to incorporate diuron or prometryn into their control regime which they are currently using. Mild impacts are expected if growers transition to newer control materials such as prometryn+trifloxysulfuron.

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National Cotton Council, August 24, 2004, Cotton Herbicide Product Profile: Typical Use Information.

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USDA Crop Profile for Cotton in Arkansas, 2000, Web address: http://www.ipmcenters.org/cropprofiles/docs/Arcotton.html

USDA Crop Profile for Cotton in Alabama, Revised 2001, Web address:
http://www.ipmcenters.org/cropprofiles/docs/alcotton.html

USDA Crop Profile for Cotton in Mississippi, 2002, Web address:
http://www.ipmcenters.org/cropprofiles/docs/MScotton.html

USDA Crop Profile for Cotton in Missouri, 2000, Web address:
http://www.ipmcenters.org/cropprofiles/docs/mocotton.html

USDA Crop Profile for Cotton in Texas, 1999, Web address:
http://www.ipmcenters.org/cropprofiles/docs/txcotton.html

USDA NASS Agricultural Chemical Summaries

York, A., 2005a, Professor of Crop Science and Extension Specialist, North Carolina State University, May 26, 2005. Personal communication with Nicole Zinn.

York, A., 2005b, Chemical Weed Control in Cotton, 2005 North Carolina Agricultural Chemicals Manual, NC State University.

Attachment 1. Fluometuron Background Use Characteristics on Cotton

The majority of fluometuron is applied using ground based equipment. The US Cotton Council estimates that 80% of the applications are via ground application 20% aerial application. Recent BEAD proprietary data suggest almost all of the application is by ground based.

BEAD was asked to estimate the timing of fluometuron applications. The timing of applications based on crop cycles is presented below in Table 1 as a percent of the total cotton acres grown.

Table 1. Timing as a percent of the Total Cotton Acres Treated at Application time*.

Application Timing	Percent of Acres Treated
At Plant	57.4
Before Emergence	21.83
Early Post	1.97
Late Post	7.37
Before Emergence	87
After Emergence	13.5

*Source: BEAD proprietary data.

Rate distribution

Table 2 shows the rate distribution range for fluometuron based on .5 lb increments. Approximately 86% is applied at 1pound ai or less per acre and 14% of the acreage is treated with more than 1 pound ai per acre.

Table 2. Fluometuron Rate Distribution*

Pounds of Active Ingredient Rate Range	Cotton Total Area Treated	Percent of Total Area Treated
0.0-0.5	5,598,527	34
0.51-1.0	8,724,607	52
1.01-1.5	1,120,685	7
1.51-2.0	875,489	5
2.01-2.50	208,792	1
2.51-3.0	141,732	1

*Source: BEAD proprietary data.

Decision #: 341155

DP #: (300562)

DATA PACKAGE BEAN SHEET

Date: 23-Sep-2005

* * * Registration Information * * *

Registration: RED-0049-19044 - Fluometuron

Company: -

Risk Manager: RM 53 - Michael Goodis - (703) 308-8157 Room# CM-2 604B

Risk Manager Reviewer: Kylie Rothwell KROTHWEL

Sent Date: Calculated Due Date: Edited Due Date:

Type of Registration: Project

Action Desc:

Ingredients: 035503, Fluometuron

* * * Data Package Information * * *

Expedite: ◯ Yes ● No Date Sent: Due Back:

DP Ingredient: 035503, Fluometuron

DP Title: SRRD MITIGATION

CSF Included: ◯ Yes ● No Label Included: ◯ Yes ● No Parent DP #:

Assigned To	Date In	Date Out	
Organization: BEAD / EAB	03-May-2005	03-May-2005	Last Possible Science Due Date:
Team Name:			Science Due Date:
Reviewer Name: Smearman, Stephen	03-May-2005		Sub Data Package Due Date:
Contractor Name:			

* * * Studies Sent for Review * * *

No Studies

* * * Additional Data Package for this Decision * * *

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* * * Data Package Instructions * * *

ATT'N: Nicole Zinn, Skee Jones, and Steve Smearman - Please provide HED and EFED (via SRRD) pesticide use information for fluometuron (PC code 035503) The following list specifies the requested use and usage information: typical application rate, application timing per season, % crop treated rotated, number of intervals, rotational crops, where aerial application methods are used, distribution of geographic location of fluometuron use and farm size In addition, please provide a benefits analysis for fluometuron that includes special benefits of fluometuron, alternatives and its market niche. Please call me if you have questions. Thank you, Kylie Rothwell 308-8055

DATA RECORDING SHEET FOR
BEAD OFFICIAL RECORDS DATA BASE
(Revised as of 4/5/05)

Author(s) Name(s) Nicole Zinn

Branches BAB

Chemical(s) Fluometuron

DP Barcode 321510

PC Code(s) 035503

Other Identifying Codes and Numbers —

Site(s) Cotton

Pest(s): ______

Pesticide Type:

- [ ] Insecticide
- [ ] Fungicide
- [x] Herbicide
- [ ] Other ______

Bean Sheet required: Y/N

we need to get received date for Bean sheet - Nicole

Rec'd 9/21/05

Check Category:

- [x] Official Record
- [ ] Reference Materials
- [x] An Electronic copy exists+have diskette
- [ ] Hard copy only

Type of Document:

- [ ] Alternatives Analysis
- [ ] Benefits Assessment
- [ ] Biological Analysis
- [ ] Economic Analysis
- [ ] ICR
- [ ] Public Interest Findings (PIF)
- [ ] Percent Crop Treated or QUA
- [ ] Reduced Risk Evaluations
- [ ] Section 18's or Emergency Exemption
- [x] Use and Usage

Processors Only:

- [ ] Date Document Signed
- [ ] Logged In/Out OPPIN: Y/N
- [ ] Date to Lydia/Files:
- [ ] Date to Bert/Files:

Processor Initials: CYR + KK
Completion Date: 9-21-05

13544

R136693

Chemical: Fluometuron

PC Code: 035503

HED File Code: 71100 BEAD Impact Assessment

Memo Date: 9/26/2005

File ID: DPD300562

Accession #: 412-07-0026