BEAD OFFICIAL RECORD

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

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

JUN 23 2004

Memorandum

DATE:

SUBJECT: Review of a Request for Emergency Exemption of Sulfentrazone in Montana for Use on Flax to Control Kochia. (04-MT-10), DP Barcode ~~(D281479)~~ D302853

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TO: Andrew Ertman
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PEER REVIEW PANEL: June 16, 2004

SUMMARY:

The State of Montana has requested sulfentrazone for use on flax to control kochia. Kochia (*Kochia scoparia*), especially ALS-resistant kochia, has become an increasing problem in Montana. This is the first request for this use but the state has already declared a crisis for this use. However, sulfentrazone has been granted in North Dakota, South Dakota, Montana, Minnesota, and Kansas for kochia control in various crops. BEAD has reviewed the subject request and has determined that if the weather conditions are favorable, this situation has the potential to be non-routine and urgent, and likely to lead to significant economic loss without the use of this chemical.

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BIOLOGICAL ANALYSIS:

Flax (*Linum usitatissimum*) in Montana is grown for seed, which is used in linseed oil. The fiber from the stems is used in fine papers, such as cigarette paper. Flax is often planted in late April to mid-May. Weed control is important in flax production because flax is not very competitive with weeds. Flax was grown on 25,000 acres and the State expects that up to 25,000 acres will need to be treated for kochia this year.

Kochia (*Kochia scoparia*) is an annual broadleaf weed with seed that does not survive long in the soil. This weed thrives under dry conditions with the help of its deep roots, which may reach up to 16 feet under drought conditions. Kochia may grow up to 7 feet tall, but typically grows 3 to 4 feet high with a bushy growth habit. Kochia often emerges around the same time as flax, but may germinate throughout the growing season. ALS-resistant (acetolactate synthase inhibiting herbicides) kochia has been documented in the region, leaving growers with fewer options for weed control (Thompson et al 1994). The ALS-resistant weeds are being selected for the in the rotational crops due to the excessive use of ALS herbicides. The requested herbicide sulfentrazone does not inhibit acetolactate synthase instead it controls weeds by inhibiting an enzyme involved in chlorophyll synthesis.

Seed dispersal occurs in a tumbleweed manner, which allows kochia to become invasive. Although kochia grows best in dry conditions, kochia has been increasing in severity despite recent wet conditions and growers have been reporting it as an increasing problem. Under wet conditions the growers may be unable to apply the primary alternative, bromoxynil, until the kochia plants are too large for adequate control.

Several herbicides are registered for use in flax. However, these herbicides either do not control kochia at all or do not provide residual control of kochia that emerges later in the growing season. Sethoxydim and clethodim are registered for grass weeds. Glyphosate is registered for use under 24 (C) for control of kochia, Canada thistle and perennial sowthistle as a pre-harvest treatment. Glyphosate may control kochia that has emerged but will not provide residual control. Bromoxynil, with or without MCPA, is registered on flax and will control kochia. However, bromoxynil must be applied before the flax exceeds 8 inches in height. Bromoxynil will control small kochia (label recommends application to 2-inch kochia) but has no residual control. Kochia that emerges after bromoxynil has been applied, or is larger at the time of application, will not be controlled. Trifluralin is registered on flax but does not provide consistent control of kochia.

Moldboard plowing before planting in weedy fields is recommended for reducing the level of infestation in kochia, which has short seed survival. A large percentage of flax fields in Montana are no tillage or reduced tillage fields and moldboard plowing is done very infrequently due to the dry, windy conditions and the high potential for erosion. Growers that do use tillage are likely to use reduced tillage. Plowing is also not likely to be beneficial for more than one season, because kochia seeds would be brought back to the soil surface after subsequent plowing. In flax production, delayed seeding and/or tillage before seeding flax will not provide adequate control because kochia may emerge later in the growing season. Cultivation during the season is also not feasible because flax is often planted in narrow rows (Zollinger, 2001).

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Kochia impacts the crop by reducing yields and interfering with harvest. At harvest, large kochia gets tangled in the combine and may even damage the combine. For this reason, growers may avoid harvesting areas of the field that are heavily infested with kochia. The State expects yield reductions from 25% to 50% using the best available alternatives (bromoxynil) for control. Weed surveys from North Dakota suggest a yield loss range of 5% in wheat to 22% in sunflower is possible (Zollinger, 2000). Work in sugarbeets suggest kochia can reduce yields up to 78% (Weatherspoon and Schweizer, 1969). Kochia is a very competitive weed, and is especially difficult to control in flax, which competes poorly with weeds (Zollinger, 2001). BEAD believes that a loss estimate of 25 to 50% is reasonable for flax.

BEAD has determined that this situation has the potential to be urgent and non-routine if kochia and ALS resistant kochia continue spreading throughout Montana.

ECONOMIC ANALYSIS:

Under the requested exemption for 2004, total usage of sulfentrazone on flax is projected to be less than 6,250 lbs. a.i.. Up to 25,000 acres of flax planted in Montana are estimated to be treated with the herbicide. As discussed above, flax producers in Montana are likely to experience significant yield losses of 25-50% in 2004, without the requested herbicide.

To determine if a significant economic loss (SEL) would occur with yield losses of 25-50%, BEAD conducted a net revenue analysis using historical production data for the years 1998-2002 based on historic yield and value figures from North Dakata. Minimum yield loss in economic terms is defined as the difference between average net revenue and the five year minimum net revenue value with price and cost held constant. To determine SEL, the difference between the baseline and the historical minimum is divided by the average gross revenue to determine the yield loss. The calculation for SEL is (5 - (-16))/90 = .234 or 23.4%. This results in the threshold yield loss that flax growers would have to meet or exceed to suffer a SEL. Montana expects a yield loss of at least 25% without the requested chemical. Therefore, BEAD finds that there would be a SEL if yield losses exceed 23.4%.

Montana provided the following historical production and economic data based on North Dakata data. The estimated 23.4% yield loss results in a net revenue of $3.83 per acre which is below the historical minimum of $5 per acre. This results in a significant economic loss using the historical revenue approach.

Historical Data* and Expected Losses for Montana Flax Producers

	Yield (bu/A)	Gross Price ($/bu)	Prod Rev ($/A)	Net Cost ($/A)	Rev ($/A)
1998	21	$5.05	$106	$82	$24
1999	21	$3.79	$80	$81	($1)
2000	21	$3.31	$70	$85	($16)
2001	20	$4.25	$85	$88	($3)
2002	18	$5.80	$104	$85	$19

Average	20	$4.44	$89	$84	$5
Baseline	20	$4.44	$90	$84	$5

Minimum % economic loss of gross revenue resulting in SEL:23.4%

* Data from North Dakata as proxy for Montana flax production.

[Note: If a pesticide is a "reduced risk" chemical, and therefore, eligible to have an analysis conducted by the yield based method (which is less burdensome for the applicant), the applicant could have submitted biological data that supported a yield loss estimate of 20% or greater. However, since sulfrentrazone is not labeled for reduced risk, there is no presumption of "reduced risk" status, and therefore, this economic analysis was based on the historical net revenue method to determine SEL.]

CONCLUSIONS:

Kochia is an increasing problem in Montana, and flax growers have no alternatives that provide residual control of kochia. The expansion in flax acreage in Montana over the last few years may have been a factor in the increased kochia pressure on flax, and the loss of efficacy of registered herbicides for kochia control. BEAD has determined that if conditions continue to be favorable to kochia growth, the criteria for an emergency condition will be met this year. The State was unable to provide BEAD with requested data on the impact of kochia in flax production. For future requests, BEAD would like the State to submit data demonstrating the yield impacts of kochia on flax using the best available alternatives, specifically bromoxynil.

REFERENCES:

Thompson, C.R., D.C. Thill, and B. Shafii. 1994. Growth and competitiveness of sulfonylurea-resistant and susceptible kochia (*Kochia scoparia*). Weed Sci. 42:172-179.

Weatherspoon, D.M. and E.E. Schwiezer. 1969. Competition between kochia and sugarbeets. Weed Sci. 17: 464-467.

Zollinger, R.K. Survey of Weeds in North Dakota - 2000. Available online at: http://www.ag.ndsu.noday.edu/weeds/ER83/ER83L.HTM

Zollinger, R. K. 2001 North Dakota Weed Control Guide, NDSU Extension Service, January 2001. Web address: http://www.ext.nodak.edu/extpubs/plantsci/weeds/w253/w253w.htm

Historical Profit Variation Template	Enter data in green spaces		Gross	Variable	Net*
*See Directions on next sheet	Yield	Price	Revenue	Cost	Revenue
Edit units if different or 1st year if not 1997	bu/acre	$/bu	$/acre	$/acre	$/acre
1998	21	$5.05	$106	$82	$24
1999	21	$3.79	$80	$81	($1)
2000	21	$3.31	$70	$85	($16)
2001	20	$4.25	$85	$88	($3)
2002	18	$5.80	$104	$85	$19
Average	20	$4.44	$89	$84	$5
Baseline--absence of emergency	20	$4.44	$90	$84	$5
Expected % loss as result of emergency	25.0%		25.0%		416.5%
Expected as a result of emergency	15	$4.44	$67	$84	($17)
Historical minimum	18		$70		($16)
Baseline minus historical minimum	2		$20		$21
% difference (baseline - historical min.)	10.9%		22.5%		389.4%
Minimum % economic loss of gross revenue (or	% yield loss-ceteris paribus)		that would result in a SEL		23.4%
Change in Costs as a result of emergency	per acre				
Increased pest control costs					
Harvesting costs	$-0.00				
Other (specify)					
Change in variable costs as a result of emergency	$0.00				
Data entry required		Enter these first.			
Additional useful but not critical information		Please enter known information.			
Data entry optional or conditionally required		Enter if appropriate.			
Calculated default values		Override with caution if appropriate.			
Transfered values from other table		Be sure to change values from both tables if you override it.			
Calculated values that should not be changed		Override only under exceptional circumstances.			
GENERAL INFORMATION					
Section 18 number (02-ST-NN)	04-MT-10				
Date review completed or due if not done	May 21, 2004				
Analysts' last names economist >	Smearman	Chism	< biologist	QCd?	
Crop	flax				
Pest	kochia				
Chemical requested	sulfentrazone				
Next best alternative	bromoxynil				
Emergency condition (< 257 characters)	bromoxynil does not provide	adequate control			
State's yield loss claim if different than what BE	assumes a 25% yield loss	Estimate ranges 25-50%			
Resistance? describe briefly	flax does not resist weed pressure well.				
Comments (up to 256 characters)					
EAB Concludes SEL? (Y/N)	Y				

Tiered Approach	Tier 1	Tier 2		Tier 3	
	Yield	Economic Loss		Economic Loss	
	Loss	as % or Gross Revenue		as % or Gross Profit	
			Gross	Variable	Net*
	Yield	Price	Revenue	Cost	Revenue
Orange values are transferred from tables above	bu/acre	$/bu	$/acre	$/acre	$/acre
Baseline--absence of emergency	20	$4.44	$90	$84	$5
Loss or change as a result of emergency	5		$22	$0	$22
Expected as a result of emergency	15	$4.44	$67	$84	($17)
Expected % loss as result of emergency	25.0%		25.0%		416.5%
Economic Loss			$22		
Economic Loss as a % of Gross Revenue			25.0%		
Economic Loss as a % of Gross Profit					416.5%
Loss Thresholds: SEL if = or >	20%		20%		50%
Is the Loss Significant?	Yes		Yes		Yes
Enter a Y if this tiered approach leads to a different conclusion than the historical approach ⟹					No

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