UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

NOV 2 1998

MEMORANDUM

SUBJECT: Review of Requests by North Dakota (98-ND-35) [Barcodes: D250311 and D250312] and Minnesota (98-MN-28) [Barcodes: D250316 and D250317] to Use Ethalfluralin (AI: 113101) to Control Kochia on Canola

FROM: James G. Saulmon, Botanist
Herbicide and Insecticide Branch
Biological and Economic Analysis Division (7503C)

David Widawsky, Economist
Economic Analysis Branch
Biological and Economic Analysis Division (7503C)

TO: David Deegan/Robert Forrest
Registration Support Branch
Registration Division (7505C)

We have reviewed the first requests by North Dakota and Minnesota for an emergency exemption to use ethalfluralin on canola to control kochia. We find the situation in North Dakota and in Minnesota to be routine. We also find little change in the weed control situation for kochia. That is, canola growers did not have adequate control of kochia in the past using trifluralin and they currently still do not have adequate control of kochia using trifluralin. The average expected percent yield loss for canola is estimated to range from 15-35% (Jenks, 1998).

Dr. Lueschen, the senior researcher of the two contacted, has done research on the control of kochia with the requested chemical (ethalfluralin), and has raised the following concerns:
(1) he recommends that the rate not exceed 0.94 lb a.i./A rate of ethalflualin (to avoid injury to canola);

(2) he feels that the Sect. 18 will be of limited value to MN, he does not see kochia as a major threat to canola in MN, and the data that he has seen indicates similar control between trifluralin and ethalfluralin. While he agrees that kochia will continue to be a likely problem in canola, he

(1)

CONCURRENCES

SYMBOL	7503C	7503(C)	7503C	7503C				
SURNAME	[signature]	[signature]	ANDERSON	[signature]				
DATE	11/2/98	11/2/98	11/2/98	11/2/98				

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does not see ethalfluralin as a viable answer.

We have an additional concern about the request for ethalfluralin to control kochia under the aegis of Section 18. As stated, kochia has long been present in the areas growing canola and canola acreage has increased extremely rapidly in the Northern Plains, from less than 25,000 acres in 1991 to more that 1 million acres in 1998. If the introduction of a new crop, canola, to the Northern Plains requires a particular weed management strategy to make the production system viable, then we question whether an emergency Section 18 exemption is the appropriate vehicle for establishing a weed management program. Rather, it would seem more appropriate to pursue the standard registration channels for products needed to control a chronic and predictable weed pest in North Dakota and Minnesota canola fields.

Biological Aspects

Canola acreage has rapidly increased in recent years according to the following personal communication (Jenks, 1998): "Canola production in ND has gone from 18,000 acres in 1991 to 800,000 acres in 1998. We expect the canola acreage to be as much as 1.4 million in 1999."

There have been prior requests for chemicals to control weeds in canola. For example, in 1997, BEAD reviewed a request from Montana (97-MT-02) to use ethalfluralin on canola to control wild buckwheat and found the situation to be routine. A second similar request (97-MT-14) was reviewed by RD. Also, in 1997, BEAD reviewed a third similar request (97-MT-17) and found the situation to be routine.

Neither the request 98-ND-35 nor 98-MN-28 provided comparative efficacy data for the registered alternative, trifluralin. However, Dr. Brian Jenks and Dr. William Lueschen provided estimates of percentage of weed control of kochia by trifluralin.

A recent Reference Files System (REFS) indicated that trifluralin [AI: 036101] is registered for use against kochia [preemergence].

Product search summaries of federally active registrations for weeds in canola, from a search of the National Pesticide Information Retrieval System listed the following active ingredients and their AI numbers: Bensulide (009801); Glyphosate, isopropylamine salt (103601), Quizalofop-ethyl (128711), Sethoxydim (121001), and Trifluralin (036101). We understand that glyphosate... is used for spot treatment, and the other chemicals, except for trifluralin, are mostly effective on grasses. Dr. Lueschen provided additional information on weed control by alternatives.

Economic Aspects:

An economic analysis is necessary to determine whether significant economic losses will ensue if the request is denied for emergency use of ethafluralin to control kochia on canola. Before presenting the economic analysis, it is worth noting two points:

1. The economic data submitted as part of the application provide no references as to the source of the data. In addition, the application fails to mention how production costs are calculated. Therefore, rather than use the submitted data for our analysis, we obtained revenue and cost of production data directly from the USDA Extension Service in North Dakota. These data are available for the 5-year period, 1993-1997, and projections are also provided for 1998.

2. In calculating costs, we included only direct operating costs. Fixed costs include overhead and management costs, as well as capital depreciation. Since *emergency, non-routine* pest damage is most likely to influence only the allocation of operating resources, including fixed costs in the analysis may distort the impact of pest damage on net revenues.

Net revenues, gross revenues less direct operating costs, are calculated below in Table 1 and shown in Figure 1, where the dotted lines indicate the range of profits for the most recent 5-year period. Given this range, a significant economic loss would occur when net revenues were at or below $18-23/acre. With 5-year averages for price ($11.42/cwt) and operating costs ($95.61/acre), the average yield associated with net revenues of $18-23/acre would be 994 to 1038 lbs/acre. Using an average 5-year yield of 1264 lbs/acre, this translates to yield losses of 18 - 21% as the minimum threshold for significant economic loss.

Using an expected canola price of $12.00/cwt (the price used in the application), the yield loss associated with significant economic loss would be 22 - 25%. It does not appear, based on the expert opinion, that such loss can be expected vis a vis the yields expected from using currently available kochia control strategies in canola.

This last point is supported by the yields projected in the 1998 estimated canola production budgets. While these budgets are not agronomic yield prediction models, they embed currently available knowledge about expected yields and potential biotic and abiotic stresses. If losses on the order of 15-35% were expected in the absence of ethalfluralin on canola, it is surprising that such adjustments were not made to expected crop budgets. Rather, these yield estimates are quite close to the 5-year average yields for canola. They suggest that while ethalfluralin may improve yields over current practices, the absence of ethalfluralin would not lead to yields substantially lower than what farmers have been realizing in recent years.

Table 1. Canola Production Costs and Returns in North Dakota: 1993 to 1997

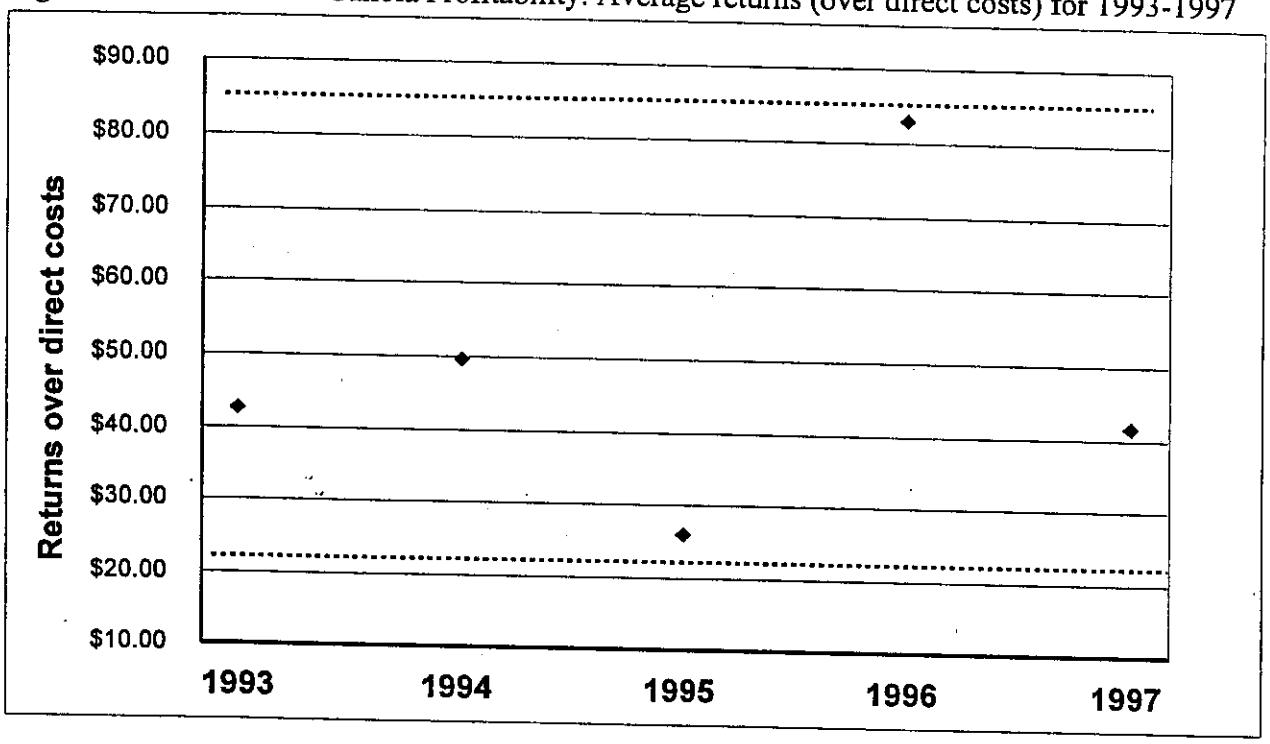
	1993	1994	1995	1996	1997	5-YEAR AVERAGE	Projected 1998[a]
Yield (lbs/acre)	1332	1097	1135	1447	1309	1264	1248
Price ($/lb)	0.0887	0.1255	0.1102	0.1294	0.117	0.1142	0.1076
Gross Revenues ($/acre)	$118.15	$137.67	$125.08	$187.24	$153.15	$144.26	$134.28
Direct Costs ($/acre)							
Seed	11.34	15.94	15.08	15.54	21.77	15.93	15.40
Fertilizer	8.95	13.43	19.07	19.95	21.36	16.55	18.14
Crop Chemicals	11.82	9.8	12.11	12.01	13.32	11.81	14.25
Crop Insurance	2.09	2.64	3.46	6.98	5.46	4.13	4.24
Fuel and Lubrication	5.76	6.38	6.21	6.61	6.19	6.23	5.61
Repairs	7.51	10.14	9.63	9.72	8.85	9.17	8.85
Land Rent	24.44	27.53	29.03	28.74	29.52	27.85	27.85[b]
Operating Interest	2.08	2.06	3.59	4.02	3.96	3.14	3.37
Miscellaneous	1.42	0.01	0.99	0.44	1.11	0.79	1.00
Sum of Direct Costs	$75.41	$87.93	$99.17	$104.01	$111.54	$95.61	$98.71
Returns to Direct Costs	$42.74	$49.74	$25.91	$83.23	$41.61	$48.65	$35.57

Source: North Dakota State University Extension Service, 1993-1998

a - projected 1998 costs were generated as a guide for budgeting purposes

b - land rent was not defined for 1998 estimates the same as for earlier data, so the 5-year average was used for heuristic purposes.

Figure 1. North Dakota Canola Profitability: Average returns (over direct costs) for 1993-1997



REFERENCES

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ATTACHMENTS

E-mail responses by Dr. Jenks and Dr. Lueschen follow:

10/20/98

To: Dr. Brian Jenks, 5600 Highway 83 South, Minot, ND
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Dr. Jenks,

Regarding Sect. 18 Requests (98-ND-35 and 98-MN-28) to use ethalfluralin on canola
Please provide responses to the questions to me within 24 hours. Many thanks for your help.
Jim Saulmon

1. Concerning control of kochia, what has changed over the last 5 years in weed control for canola crops in ND/MN?

Ans:

A) **We have seen an increase in kochia populations over the past few years. This increase is due in part to kochia that is not being controlled in small grains by sulfonylurea (SU) herbicides. These plants then set seed and return in greater numbers the next year. We are seeing greater populations of SU-resistant kochia plants all across the state. This past summer, we estimated that 20-30% of the kochia population in our university small grain trials was SU-resistant. This field also had disease (scab) problems due to continuous wheat. We are rotating to canola in this field next year. Many growers across ND have higher populations of SU-resistant kochia than our fields.**

B) **The last three years in the north central ND, we have experienced below normal rainfall during the spring months. Kochia is well adapted to drought conditions and is more competitive under dry than under wet conditions (Blackshaw, Weed Technology, 1990) Soil-applied herbicides need moisture to be activated and to control weeds. Under dry conditions and without complete herbicide activation, a weed such as kochia can be extremely competitive, especially if high populations are present due to a lack of control in previous years. These uncontrolled plants will contribute an abundance of seed to the soil seedbank.**

C) **Canola production in ND has gone from 18,000 acres in 1991 to 800,000 acres in 1998. We expect the canola acreage to be as much as 1.4 million in 1999. This increase in canola acres is due in part to low wheat prices and severe wheat disease problems that have been devastating to many producers across the state. Growing a crop other than small grains is almost essential for many producers to break these disease cycles and to grow a crop that has a chance to be profitable.**

2. Has trifluralin, applied in ND/MN canola, ever given acceptable weed control of kochia?

Ans:

A) **Most producers in ND use Treflan TR-10 granules. Kochia is NOT listed on the Treflan TR-10 label as controlled. It may have been acceptable only because the control it does provide is better than nothing. With higher kochia populations, the increased control with ethalfluralin is significant.**

B) **To get additional control from trifluralin, producers would have to use higher rates that would result in carryover to the next year. This would limit them to growing the same crop (canola) or another crop the next year that would present a possible disaster due to disease.**

C) **Producers prefer the fall application of granules because it is more effective in conservation tillage. Many producers are trying to reduce soil erosion and catch winter snows to retain moisture. The liquid formulation is less effective in conservation tillage because the stubble will catch and retain a lot of the solution.**

D) **Producers are trying to reduce their spring work load by doing some of it in the fall. They are more likely to get the crop in on time if they can make one pass and seed in the spring as opposed to two passes and seed.**

2a. If so, at what % control? When?

60-70% control under optimum conditions. Producers I have visited with rate control lower than this.

3. Has clopyralid , applied in ND/MN canola, ever given acceptable weed control of kochia?
Ans:

No.

3a. If so, at what % control? When?

No control at all.

4. What is the expected % yield loss for canola without the use of ethalfluralin?
Ans:

This depends on the kochia population, but on average will range from 15-35% .

5. Is this yield loss estimate for canola based on no weed control at all?
Ans:

This is based on a range of kochia populations with trifluralin applied pre-plant incorporated. Fields with higher kochia populations will experience severe yield reductions.

At 10:27 AM 10/27/1998 -0500, you wrote:
>Dr. Jenks,
>Thank you for your previous comments. Please respond within
>24 hours. Many thanks. Jim Saulmon
>
>Question:
>
>Can rotation to sunflower, sugarbeets, potatoes, dry beans, or other
>similar crops help reduce kochia populations by use of
>herbicides registered for those crops?
>Ans.

Dr. Saulmon:

I have been out of town for several days. I apologize for not being able to respond earlier. My response is below. Thank you for your assistance.

Brian Jenks

Sunflower - Sonalan is labeled in Sunflower. Sunflower production will require purchase of row crop equipment that many growers do not have.
Sugarbeets - this is not an option to most growers in the state...production is limited to the far eastern part of the state or northwest corner where there is irrigation.
Potatoes - same comment as sugarbeets

Corn, Soybeans - Grown primarily in SE corner of ND...not enough moisture and heat elsewhere
Crambe - no product available
Dry Beans - Sonalan is labeled in Dry Beans; Pursuit is labeled, but won't control SU-resistant kochia and has unacceptable carryover. However, dry beans require purchase of special equipment. Production is limited to primarily 3 counties in the state.
Peas - Sonalan is labeled in Dry Beans; Pursuit is labeled, but won't control SU-resistant kochia and has unacceptable carryover. Low market prices has limited the dry pea production in the state.
Lentils - no product available
Safflower - Primarily grown in far western counties...no product to control kochia

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Dr. Lueschen,
Regarding Sect. 18 Request (98-MN-28) to use ethalfluralin on canola, please provide written responses to the questions to me within 24 hours. Many thanks for your help.
Jim Saulmon

1. Concerning control of kochia, what has changed over the last 5 years in weed control for canola crops in MN?
Ans: Canola acreage in MN has increased dramatically in the last 5 years in north western MN. Acreage has gone from about 6000 acres in 1992 to about 175000 in 1998. There are only 3 herbicides that have federal labels for canola- trifluralin(Treflan), sethoxydim(Poast) and quizalofop(AssureII). These products are strong on annual grasses but weak on broardleaf weeds. In the past few years kochia has become a more severe weed problem in NW MN. This is partially related to the develop of ALS resistant kochia. As the acre continues to expand in NW MN kochia will become a more serious pest in canola.
2. Has trifluralin, applied in MN canola, ever given acceptable weed control of kochia?
Ans: Trifluralin will give some suppression of kochia but will not be efficacious on heavy infestations of this weed species. I also do not think that Sonalan will give good control of this species based on what I found discussing this topic with other weed scientist. Although Sonalan may give slightly better kochia control than Treflan, I think the differences are too small to be meaning. Therefore, to issue a Sec 18 for Sonalan based on better kochia control than Treflan is not warranted.

2a. If so, at what % control? An estimate of control would be in the range of 50-60%. When? This level of control would be expected on light infestations of this species. With heavy infestation the level of control may be considerably less.

3. What is the expected % yield loss for canola without the use of ethalfluralin?

Ans: This will depend on the level of infestation. Kochia is a very competitive weed species that can reduce canola yields by 50% or more with heavy infestation. Under heavy infestations of kochia I think yield reduction from kochia will be similar for Treflan and Sonalan.

4. Is this yield loss estimate for canola based on no weed control at all?
Ans: The above answer is based on no control of kochia.

Jim:

I would like to make a few additional comments. As I discussed with you, I am concerned about canola injury potential with Sonalan. We have had several trials where Sonalan has caused more early season injury and stand reduction in canola than trifluralin(Treflan). All of my trials have been done at the 0.94 lb [a.i.]/A rate of Sonalan. It is my understanding that the Sec 18 request had rates higher than this. I would recommend that the rate not exceed the 0.94 lb [a.i.] /A if the Sonalan Sec 18 is issued. I think one of the justifications that DowAgro Sciences will use for the higher is that kochia control will be better at the higher rates. However, the higher the rates the greater the potential for canola injury. It is my feeling that a Sec 18 for Sonalan would be of limited benefit to MN canola growers because I have not seen kochia as a major threat to our canola production and what little data I have seen indicates similar control between Treflan and Sonalan. As the canola acreage continues to expand kochia will become a more serious problem but I do not see Sonalan as the answer to this problem.

Please let me know if you have an additional questions.
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