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WASHINGTON, D.C. 20460

MAY 29 1996

OFFICE OF  
PREVENTION, PESTICIDES AND  
TOXIC SUBSTANCES

MEMORANDUM:

SUBJECT: Oxyfluorfen. Fallow Bed Uses and Rotational Crop Study (165-1), Chemical No. 111601. Case No. 2490. MRID No. 40567001. DP Barcode: D225497. CBRS No. 17186.

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THRU: Ed Zager, Chief *Ed Zager*  
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TO: Paula Deschamp, Section Head  
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**BACKGROUND**

The Phase IV review on oxyfluorfen (S. Funk, 3/16/91) noted that the GOAL 1.6E label allows for the use of the product on "fallow beds" for control of pre- and post-emergence winter annual broadleaf weeds. Numerous crops and crop groupings are listed for direct-seeding to fallow beds after treatment. Several other crops are also listed as transplant crops to be planted to fallow beds after treatment. General statements covering "all seeded crops" and "all other crops" are listed on the label under this use. The Phase IV recommended for removal of these generic statements, and required a series of residue trials to depict residues of oxyfluorfen on those crops listed for direct-seeding or transplanting after treatment of oxyfluorfen for which no residue trial data exist.

In their 90-day response to the Phase IV review, the registrant requested a waiver from the field trials for fallow bed uses citing a confined rotational crop study in support of the existing fallow bed uses. In a CBRS memo dated 4/16/92 (F. Fort, CBRS No. 9024, DP



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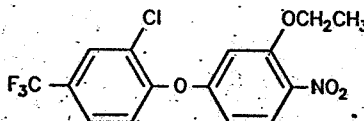
Barcode: D171996) the registrant's previously submitted rotational crop study was deemed acceptable for review under Phase V and determining the need for residue trial data. However, any other requirements were reserved pending full review of the rotational crop study. The rotational crop study is reviewed here as bridging data for labelled fallow bed uses. CBRS notes that EFED reviewed this study in a memo dated 8/23/88 (P. Ott, EFED/EAB No. 80617) and found it acceptable. This EFED review was used in conjunction with the study MRID for this CBRS review.

Tolerances are established for residues of the herbicide oxyfluorfen [2-chloro-1-(3-ethoxy-4-nitrophenoxy)-4-trifluoromethyl)benzene] and its metabolites containing the diphenyl ether linkage in or on various commodities including artichokes, avocados, bananas, broccoli, cabbage, cauliflower, cocoa beans, coffee, corn grain, cottonseed, dates, feijoa, figs, grapes, kiwifruit, olives, onions, persimmons, pistachios, pome fruits group, pomegranates, soybeans, stone fruits group, and tree nuts at 0.05 ppm (40 CFR 180.381(a)). Tolerances with regional registration are established for residues of oxyfluorfen and its metabolites containing the diphenyl ether linkage in raw agricultural commodities guava, papaya, and taro (corms and leaves) at 0.05 ppm (40 CFR 180.381(b)).

Food additive tolerances are established for residues of oxyfluorfen and its metabolites containing the diphenyl ether linkage in processed commodities cottonseed oil, mint oil (peppermint and spearmint) and soybean oil (40 CFR 185.4600).

Adequate methodology is available for the enforcement of tolerances for oxyfluorfen residues in or on plant and animal commodities (CBRS No. 17106, 5/8/96, C. Eiden). The nature of the residue in plants is adequately understood. The residue to be regulated is oxyfluorfen, per se, (S. Knizner, 4/8/94, CBRS No. 12513, 12522, 13212, and 13228). The structure of oxyfluorfen is given below:

#### OXYFLUORFEN



## CONCLUSIONS

1. The rotational crop study reviewed here under Phase V is adequate and satisfies GLN 165-1 as per the previous EFED review (EAB no. 80617, P. Ott, 8/23/88).
2. In support of fallow bed uses, the rotational crop study can be used in lieu of GLN 171-4(k) field trial data to support the following minimum treatment to planting intervals for direct-seeded crops given on the GOAL 1.6E label: for leafy vegetables, 120 days; for root and tuber vegetables, 90 days; for cereal grains, 10 months. This decision is based on the presence of negligible levels (<0.06 ppm) of total radioactive residues (TRR) in the rotational crops used in the study at these minimum treatment to planting intervals. Further, as determined from available field trial studies, oxyfluorfen residues in a variety of crops are non-detectable (<0.01 ppm). (See CBRS Nos. 16313, SAK, 1/2/96; 17106, 17049, & 17121, CAE, 5/8/96.)
3. Several of the minimum treatment to planting intervals listed on the labels should be changed in accordance with conclusion 2 above. The remaining treatment to planting intervals for other crops on the label under the portion regarding direct-seeded crops are acceptable.
4. The rotational crop study cannot be used to support any minimum treatment to planting intervals for any of the transplanted crops listed under fallow bed uses on the GOAL 1.6E label. The minimum treatment to planting intervals given for transplanted crops are 0 to 30 days. CBRS considers this a direct pre-emergence treatment. The registrant can either remove all crops without tolerances from the portion of the label dealing with transplanted crops or conduct residue trials for those transplanted crops without tolerances. The residue data can then be used to establish tolerances. According to 40 CFR 180.381, crops listed under the transplanted crops portion of the label without tolerances are: celery, garlic, pepper, tomato, and strawberry.
5. ~~The generic label statements covering "all other crops" and "all seeded crops" must be removed from that portion of the label regarding fallow bed uses. The 4/16/92 review iterated that these generic label statements were too broad and should be deleted.~~

## RECOMMENDATIONS

The registrant should be advised that the rotational crop study satisfies GLN 165-1 as previously determined by EFED. Further, the rotational crop study can be used in lieu of 171-4(k) studies to partially support "fallow bed" uses. The registrant should be advised of the following as regards fallow bed uses on the GOAL 1.6E label and any other product labels with fallow bed uses (i.e., GOAL 2XL and 2E):

All generic statements regarding "All Other Crops" and "Other Seeded Crops" must be removed from the label(s).

For racs listed as transplanted crops under the fallow bed uses portion of the label, which do not have tolerances for oxyfluorfen, the registrant may either remove them or conduct residue field trials for them in accordance with "Pesticide Reregistration Rejection Rate Analysis Residue Chemistry: Number and Location of Domestic Crop Field Trials: June 1994". Once the residue data are submitted a tolerance can be established for these racs. They are: celery, garlic, pepper, tomato, and strawberry. Although citrus is listed as a transplanted crop on the label for which there is no tolerance, citrus uses are exempted because the use is for non-bearing trees. Detectable residues in citrus fruits are not expected from this use.

For crops listed as direct-seeded crops under the fallow bed uses portion of the label, the registrant should change the minimum treatment to planting intervals as follows: for leafy vegetables, 120 days; for root and tuber vegetables, 90 days; for cereal grains, 10 months. The remaining minimum treatment to planting intervals are acceptable.

#### Note to SRRD:

CBRS recommends the registrant be contacted for a meeting with CBRS/SRRD regarding this particular use issue, i.e., fallow bed uses. There are portions of the label(s) that are inconsistent with regards to the fallow bed uses and the rotational crop plantback intervals. These discrepancies need to be clarified. Specifically, some of the minimum treatment to planting intervals listed under fallow bed uses for direct-seeded crops are greater than the 60-day "plantback" interval listed for all direct-seeded rotational crops. The portion of the label dealing with transplanted rotational crops should be deleted. These issues should be discussed with the registrant.

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## DETAILED CONSIDERATIONS

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### Directions for Use

REFS lists three products containing the active ingredient oxyfluorfen registered for use on fallow beds. They are: GOAL 2XL, 2E, and 1.6E. GOAL 1.6E allows a maximum seasonal rate of 0.5 lbs. a.i./A to fallow land for the control of pre- and post-emergent winter broadleaf weeds. The crops listed on the GOAL 1.6E label for direct-seeding or transplanting to fallow beds after application, and the minimum treatment to planting intervals associated with them are given in the following table:

Treatment-to-planting intervals and use rates for various crops are indicated in the table below.

Goal Herbicide on Fallow Beds		
Direct Seeded Crops	Treatment to Planting Interval (days)	
	Use Rates: <0.25 lbs ai/A	<0.50 lbs ai/A
Carrot	90	90
Potato	60	60
Sugarbeet	60	90
Other Root/Tuber Veg.	90	90
Onions	180	180
Other Bulb Veg.	180	180
Cabbage	90	90
Cauliflower	90	90
Other Brassica Crops	120	120
Lettuce	90	120
Other Leafy Veg. except Brassica Crops	120	120
Pepper	90	120
Tomato	60	120
Other Fruiting Veg.	120	120
Cantaloupe	60	90
Squash	90	120
Watermelon	60	60
Other Cucurbits	90	120
Dry Beans	60	60
Peanuts	60	60
Soybeans	0	0
Other Legume Veg.	60	60
Cotton	14	14
Safflower	60	60
Conifer	0	0
Cereal Grains	10 months	10 months
Other Seeded Crops	180	180
<b>Transplanted Crops</b>		
Broccoli	0	30
Cabbage	0	30
Cauliflower	0	30
Celery	30	30
Conifer	0	0
Garlic	0	30
Grape/Kiwi	0	0
Onion	0	30
Pepper	30	30
Strawberries	30	30
Tomato	30	30
Tree fruit/Nut/Citrus	0	0
All other crops	90	180

### Test System and Materials

One test plot, 50' x 50', was established outside and subdivided into ten 20 ft<sup>2</sup> subplots. Five of the subplots were treated with oxyfluorfen radio-labelled in the nitrophenyl ring; the other five were treated with oxyfluorfen radio-labelled in the chlorophenyl ring at a rate of 1.0 lbs. a.i./A. This rate of treatment equates to a 2X maximum use rate. One plot from each label was planted with a representative grain, root, and leaf crop (all planted from seed, i.e., direct-seeded), as well as three transplanted crops (squash, tomato and pepper) at 0- and 30-day intervals after the treatment. Only small grain, root, and leaf crops were planted, as seed, at 60-, 90-, and 120-day intervals after the treatment. All crops were allowed to grow to maturity, harvested, cleaned to remove dirt and separate leafy plant tops from roots, homogenized, and frozen until analyzed for total radioactivity.

### Analytical Method

All samples were stored at -15°C prior to analysis. Five subsamples (0.5 g) were weighed into containers, combusted, and radioassayed. After combustion, total <sup>14</sup>CO<sub>2</sub> was trapped and analyzed by liquid scintillation counting. Combustion efficiency was 100 to 104%. The limit of detection (LOD) was 0.01 ppm for crops, except for the small grain chaff and straw samples, for which the LOD was 0.02 ppm.

### Residue Results

Results of the rotational crop study (MRID 40567001) reviewed here and previously by EFED are presented in Table 1. These results are used here as "bridging data" to partially support fallow bed uses in lieu of residue trial data for the following reasons:

Existing residue data from field trials for corn, horseradish, onions, soybeans, cottonseed, apple, avocado, figs, pomegranates, kiwi, olives, artichokes, and cherries show non-detectable residues of oxyfluorfen (<0.01 ppm).

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Results from the rotational crop study indicate that total radioactive residues (TRR) are either at the detection limit or non-detectable ( $\leq 0.01$  ppm) in a variety of crops at or close to the minimum treatment to planting intervals specified on the label under fallow bed uses. TRR was highest, ranging from 0.02 to 0.06 ppm, in wheat chaff and straw at a 60-day treatment to planting interval. CBRS concludes that further identification of the 0.06 ppm residue is not warranted because the study was conducted at 2X and oxyfluorfen residues are not likely to be present 10 months after treatment, i.e., the treatment to planting interval on the label under fallow bed uses for small grains.

Fallow Bed: Direct-Seeded Crops: CBRS concludes that detectable oxyfluorfen residues are not expected in crops that are directly-seeded to fallow beds treated with oxyfluorfen according to label directions and in accordance with the following minimum treatment to planting intervals: leafy vegetables, 120 days; root and tuber vegetables, 90 days; cereal

grains, 10 months; curcurbit, legumes, and fruiting vegetables, 60 days. TRR were non-detectable in all of the direct-seeded crop samples (grains, leafy vegetables, and root and tubers) analyzed at these intervals.

Table 1. Total Radioactive Residues (TRR) of Oxyfluorfen in Rotational Crops (ppm).

Radiolabeled Oxyfluorfen Residue Levels in Rotational Crops				
Crop	Sample Component	Treatment to Planting Int.	Total Average <sup>14</sup> C-Oxy. Found (ppm)	
			NPR label	CPR label
Tomato	Fruit	0	NDR (4); 0.009 (1)	NDR
Pepper	Fruit	0	NDR	NDR
Squash	Fruit	0	NDR	NDR
Beets	Root	0	NDR (3); 0.01 (2)	NDR
Swiss Chard	Leaf	0	NDR	NDR
Spring Wheat	Grain	0	NDR	NDR
Spring Wheat	Chaff	0	NDR	NDR
Spring Wheat	Straw	0	0.03	NDR (3); 0.02 (2)
Tomato	Fruit	31	NDR	0.04
Pepper	Fruit	31	NDR (4); 0.01 (1)	NDR
Squash	Fruit	31	NDR	NDR (4); 0.01 (1)
Beet	Root	31	NDR	0.01
Swiss Chard	Leaf	31	NDR (2); 0.01 (3)	NDR
Spring Wheat	Grain	31	0.01	NDR
Spring Wheat	Chaff	31	NDR	NDR
Spring Wheat	Straw	31	NDR	NDR (4); 0.04 (1)
Beet	Root	31	0.03	NDR (4); 0.02 (1)
Swiss Chard	Leaf	61	NDR	NDR (4); 0.01 (1)
Turnip	Root	61	NDR (4); 0.01 (1)	NDR
Collards	Leaf	61	NDR	NDR
Spring Wheat	Grain	61	NDR	NDR
Spring Wheat	Chaff	61	NDR	NDR
Spring Wheat	Straw	61	NDR (4); 0.02 (1)	NDR (4); 0.02 (1)
Swiss Chard	Leaf	91	0.03	0.06
Turnips	Root	91	NDR	NDR (1); 0.01 (4)
Collards	Leaf	91	NDR	NDR
Turnips	Root	123	NDR	0.01
Collards	Leaf	123	NDR	NDR

Note: The average ppm residue found could not be determined due to the inability to average NDR values with detectable residues for the five replicate crop combustion samples so they were reflected by the number of each NDR and detectable residue found. Single values indicate average was determined.

NDR = no detectable residues at the limit of detection of the analyses ( $\leq 0.008$  ppm).

**Fallow Bed: Transplanted Crops:** TRR in the transplanted crops (tomatoes, peppers, and squash) were  $\leq 0.01$  ppm at the 0 and 30-day treatment to planting intervals. These data do not support the minimum treatment to planting intervals (0 to 30 days) listed for transplanted crops on the label under fallow bed uses. CBRS considers transplanting crops 0 to 30 days



after application of a pesticide to soil as a direct pre-emergent treatment to the crop. All crops listed as transplanted crops under fallow bed uses which do not have tolerances, except citrus (non-bearing), must be removed from the label or the registrant must submit residue trial data in support of establishing a tolerance for these crops. These crops are: celery, conifer, garlic, pepper, strawberry, and tomato. Citrus uses are exempted because the use is for non-bearing trees; detectable residues in citrus fruits are not expected from this use.

Storage Stability

Storage stability data were not submitted with this study. As the study tested for total radioactive residue (TRR) only, these data are not necessary.

✓ cc: Mark Wilhite, Chemical Review Manager  
Accelerated Reregistration Branch  
Special Review and Reregistration Division (7508W)

RF, SF, List B File, Circ.

RDI: Pilot Team 05/16/96, R. Perfetti 05/22/96, E. Zager 05/24/96

7509C: CM#2: Room 800: 305-7887: CAE 05/29/96

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