EEB FILES
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RECORD NO.

105001
SHAUGHNESSEY NO.

REVIEW NO.

EEB REVIEW

DATE: IN 4/26/89 OUT MAY 16 1989

FILE OR REG. NO 89-MN-05

PETITION OR EXP. NO

DATE OF SUBMISSION: 4/4/89

DATE RECEIVED BY EFED: 4/25/89

RD REQUESTED COMPLETION DATE: 5/9/89

EEB ESTIMATED COMPLETION DATE: 5/9/89

RD ACTION CODE/ TYPE OF REVIEW: 510

TYPE PRODUCT(S): Insecticide/Nematicide

ACCESSION NUMBER(S):

PRODUCT MANAGER: D.Stubbs (41)

PRODUCT NAME(S): COUNTER 5G

COMPANY NAME: Minnesota Dept. of Agriculture

PURPOSE OF SUBMISSION: Proposed Section 18 for use on rape.

SHAUGHNESSEY NO.	CHEMICAL AND FORMULATION	%A.I.

7 pages w/ Attachment

ECOLOGICAL EFFECTS BRANCH REVIEW

Chemical: COUNTER 5G (Terbufos)

100 Submission Purpose and Label Information

100.1 Submission Purpose and Pesticide Use

The Minnesota Department of Agriculture is requesting an emergency exemption (Section 18) for the use of COUNTER 5G (terbufos) for control of flea beetles on canola (rape). COUNTER 5G will be applied to a maximum of 50,000 acres of rapeseed. The emergency exemption is requested to be approved for use from April 15, 1989 through October 15, 1989.

100.2 Formulation Information

Active Ingredient:	
Terbufos (S-[[(1,1-Dimethylethyl)Thio]Methyl]0,0-Diethyl Phosphorodithioate)	5%
Inert Ingredients	95%
Total	100%

GranularFormulation

100.3 Application Methods, Directions, Rates

COUNTER 5G will be mixed with the seed in the drillbox with a mixing stick. COUNTER 5G will be applied with the seed at planting time at 10 lb/acre (0.50 lb a.i./acre) and will be covered with soil after application. The submission states: "Additional application instructions and restrictions are in the proposed Counter 5-G label"; however, no proposed label was included.

100.4 Target Organism

Flea beetle

100.5 Precautionary Labeling

The submission states that potential risks to the environment are addressed in the proposed COUNTER 5G label; however, no proposed label was included.

101 Hazard Assessment

101.1 Discussion

Terbufos is the active ingredient in COUNTER 15G, a 15% granular formulation systemic organophosphate insecticide currently registered for use in corn, grain sorghum, and sugar beets (EPA

Registration Number 241-238). These crops encompass some 900,000 to one million acres of cropland in Minnesota. According to David M. Noetzel, Minnesota Extension Service, nearly all of the rapeseed in Minnesota is grown in the northwestern region of the state; predominant counties of COUNTER 5G usage will include Kittson, Roseau, Marshall, Pennington, Red Lake, and Polk (telephone conversation 5/3/89). COUNTER 5G has no registration in the U.S.

Similar exemption requests were reviewed by EEB 2/6/89 and 2/27/89 (Record Nos. 238228 and 239671) for North Dakota and Montana. It was determined in these reviews that use of COUNTER 5G on rape and mustard in these states would cause adverse effects to some species of fish and significant impact on aquatic invertebrates to nearby aquatic ecosystems. Further, it was determined where these impacts occurred, adverse effects to shorebirds and waterfowl were likely to result. The latter hazard is of significant ecological concern given the inclusion of major waterfowl production areas within proposed COUNTER use areas and the record low waterfowl population levels. After further consideration, Douglas Campt, Director, Office of Pesticide Programs, authorized both exemption requests "with great reservation" (EPA notification to each state dated 4/6/89).

101.2 Likelihood of Adverse Effects to Nontarget Organisms

Terrestrial Species

Terbufos is characterized as extremely toxic to bobwhite quail based on avian acute oral studies. One acute oral test (MRID No. FEOTERO2) using the technical grade active ingredient determined the bobwhite LD_{50} to be 28.6 mg/kg. Another study using the technical grade concluded the bobwhite LD_{50} was 15 mg/kg (Hill and Camardese 1984). Using the 15G formulated product, Hill and Camardese (1984) determined the bobwhite LD_{50} to be 26 mg/kg on an active ingredient basis. Another study (Balcomb et al. 1984) utilizing graduated doses of the 15G formulated product resulted in 100% mortality of 5 male red-winged blackbirds orally administered 10 COUNTER granules; a 5 granule dose resulted in no mortalities. Assuming proportional results would be obtained from testing with a 5G product, the LD_{50} equivalent for songbirds would be between 15 and 30 5G granules.

Terbufos is also considered to be highly toxic to bobwhite quail based on avian dietary studies. Two acceptable avian dietary tests determined the bobwhite LC_{50} to range from 143 ppm (MRID No. 00087717) to 157 ppm (MRID No. 160387).

The primary route of exposure of granular terbufos to nontarget terrestrial species is through direct ingestion of the granules. Given that the COUNTER 5G granules will be covered with soil along with the rape and mustard seeds at planting, minimal exposure of granules is expected. Although soil-probing birds may

ingest granules either as grit or as attached to prey items (e,g, earthworms), it is unlikely that a lethal dose (i.e., 15-30 granules) would be consumed under typical foraging circumstances.

However, due to adverse effects on aquatic invertebrates likely to occur with this use (discussed below), waterfowl rearing broods are likely to be impacted in areas of terbufos use. This is especially critical given that this proposed use includes major waterfowl production areas (the prairie pothole region), the already record low waterfowl population levels, and the significant dependence of waterfowl chicks on aquatic invertebrates for growth and survival during April-June. Similar hazards to shorebirds may also be expected. According to Todd Eberhardt, Group Leader for Waterfowl Populations and Research, Minnesota Department of Natural Resources, the proposed area of use for this exemption is an ecologically important area, representing some of the best prairie pothole habitat for waterfowl production in the state; as such, Mr. Eberhardt expressed grave concern for any potential impacts to waterfowl which may result from this proposed use of terbufos (pers. comm. 5/3/89). Due to this potential hazard, COUNTER 5G should not be applied to watersheds of ponds, potholes, or other wetlands.

Aquatic Species

Technical terbufos is very highly toxic to bluegill sunfish (LC_{50} values range from 0.77 ppb (MRID No. 00087718) to 3.8 ppb (MRID No. 0037483)), brown trout (LC_{50} = 20 ppb, MRID No. 00087718), rainbow trout (LC_{50} = 9.4 ppb, MRID No. 00037483), and channel catfish (LC_{50} = 9.6 ppb, MRID No. 00085176). COUNTER 15G formulated product is also considered to be very highly toxic to bluegill sunfish (LC_{50} = 12.3 ppb, MRID No. FEOTERO4) and rainbow trout
(LC_{50} = 59.7 ppb, MRID No. FEOTERO5).

Terbufos is characterized as very highly toxic to freshwater invertebrates on the basis of acute toxicity data. Daphnia magna were found to have an LC_{50} of 0.31 ppb (MRID No. FEOTERO3) and crayfish an LC_{50} of 8.0 ppb (MRID No. 00085176). An acute LC_{50} study using the 15% granular formulation determined the LC_{50} for Daphnia magna to be 6.2 ppb.

Aquatic organisms may be exposed to terbufos via runoff and soil transport from treated sites. All pesticides applied within the upper 1/2 inch of the soil profile are considered available for runoff. Terbufos load (EEC) to a farm pond (6 feet deep), a pothole marsh (18 inches deep), and a shallow water wetland (6 inches deep) may be estimated by the following scenario:

EEC (load ppb) = application rate (lb ai/acre) X percent available X

0.02 ("average" 2% runoff for intermediate solubility) X 10 acre ("average" watershed) X

concentration factor for water depth (61 ppb/lb for 6 ft; 245 ppb/lb for 18 inches; 734 ppb/lb for 6 inches)

Since rape seeds are typically planted no deeper than 1/2 inch, all terbufos applied with this use is considered available for runoff. At maximum application rates, the EEC for an average farm pond is then 6.1 ppb; concentrations in a pothole marsh and shallow water wetlands are estimated to be 24.5 ppb and 73.4 ppb, respectively. All aquatic ecosystem EECs exceed the LC_{50} values for bluegill and aquatic invertebrates. Therefore, adverse effects to aquatic organisms, especially invertebrates associated with shallow water habitats, are to be expected with this exemption use. This potential runoff problem is made even more critical given the poorly drained soils which predominate in the proposed use region. For this reason, COUNTER 5G should not be applied to watersheds of ponds, potholes, or other wetlands.

101.3 Endangered Species Considerations

Based on the most recent information available to EEB, the only endangered species known to occur in Minnesota which may be affected through this exemption use is the bald eagle (reported in Marshall County). The eagle feeds on fish and other animals associated with ponds and wetland areas. As such, the birds may be affected through food supplies contaminated by runoff containing terbufos. Due to the potential hazard to this endangered species, COUNTER 5G should not be applied to watersheds of ponds, potholes, or other wetlands.

101.4 Adequacy of Toxicity Data

EEB has identified environmental hazard likely to occur with this exemption use from available basic toxicity data. As identified in the revised EPA Registration Standard for terbufos (540/RS-88-121; September 1988), a definitive (Level II) terrestrial field study, acute toxicity testing on estuarine and marine organisms, and aquatic field studies are required to support currently registered uses of terbufos.

101.5 Adequacy of Labeling

No proposed labeling was included with the exemption request. Precautionary labeling must include the following statement:

ENVIRONMENTAL HAZARDS

This pesticide is toxic to fish, birds and other wildlife. Treated granules exposed on soil surface may be hazardous to birds and other wildlife. Cover or incorporate granules that are spilled. Do not apply directly to water or wetlands (swamps, bogs, marshes or potholes). Runoff from treated areas may be hazardous to aquatic organisms in neighboring areas. Do not contaminate water when disposing of equipment washwaters.

102 Conclusions

EEB has reviewed the proposed emergency exemption for the use of COUNTER 5G on rape in Minnesota. EEB concludes that the proposed use will result in adverse impacts to some species of fish and aquatic invertebrates through runoff from treated areas. Further, waterfowl and shorebirds are likely to be adversely affected through reductions in aquatic food supplies due to runoff, and the endangered bald eagle may be similarly affected through contaminated food supplies. Therefore, COUNTER 5G should not be applied in watershed areas of lakes, ponds, potholes, marshes and other wetlands.

Dail Warburton 5/11/89

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Literature Cited

Balcomb, R., R. Stevens, and C. Bowen II. 1984. Toxicity of 16 granular insecticides to wild-caught songbirds. Bull. Environ. Contam. Toxicol. 33:302-307.

Hill, E.F. and M.B. Camardese. 1984. Toxicity of anticholinesterase insecticides to birds: technical grade versus granular formulations. Ecotoxicol. Environ. Safety 8:551-563.

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February 28, 1989

Mr. Cal Blanchard
Minnesota Dept. of Agriculture
90 W. Plato Blvd.
St. Paul, MN 55107

Dear Cal:

I would like to request either a Sec 18 or a Sec 24C label for the use of 0.5 lb AI/acre of Counter 5G for control of flea beetle on canola (rape). With the withdrawal of the Furadan label (letter of Dec. 28, 1988) we have no effective alternative insecticide for this purpose. It would be most wise to permit crushing of canola (rape) in the United States as part of the label.

North Dakota has already requested a Sec 18 for this purpose. Granting a Sec 18 (or 24C) for Minnesota would keep adjacent canola production areas with more uniform insecticide recommendations.

I understand that the canola market has considerable encouragement by Frito-Lay who will contract acreage for use in frying potato and other kinds of chips. Canola oil has the least saturated fats among present commercial vegetable oils and is thus highly attractive to a diet conscious public. The crop will provide an alternative crop for northwestern Minnesota. It will be contracted through HarvestStates a Minnesota based cooperative.

I have found flea beetle populations to be quite variable from field to field. However when high numbers of flea beetles are present, as there were in 1988, they are devastating to the crop. At this time I would recommend a planting time treatment of counter 5G if it were labeled because rescue foliars are not consistently effective and one cannot predict severity of damage before planting.

I have enclosed the same data I sent in the 28 Dec. letter plus some 1980-81 data from North Dakota. We will run additional trials in 1989 to compare 1/2 and 1 lb rates of Counter at planting time.

There is also an acute need for another foliar on canola (rape) in atldition to methyl and ethyl parathion. Both these compounds are reasonably toxic and have a restricted use registration. A safer but equally effective foliar would fit nicely.

If there are questions please feel free to call me at (612) 624-9272.

Sincerely yours,

David M. Noetzel

David M. Noetzel
Extension Entomologist

DMN/me

enc.
cc: Mina Ginis, American Cyanamid