

041701  
SHAUGHNESSEY NO.9  
REVIEW NO

## EEB BRANCH REVIEW

DATE: IN 5/7/81 OUT 7/15/81

FILE OR REG. NO. 476-2028

PETITION OR EXP. PERMIT NO.

DATE OF SUBMISSION 2/31/81

DATE RECEIVED BY HED 5/5/81

RD REQUESTED COMPLETION DATE 7/15/81

EEB ESTIMATED COMPLETION DATE

RD ACTION CODE/TYPE OF REVIEW 310/Amendment -- He Too

TYPE PRODUCT(S): I, D, H, F, N, R, S Insecticide

DATA ACCESSION NO(S). 244845

PRODUCT MANAGER NO. W. Miller (116)

PRODUCT NAME(S) Dyfonate 20 G

COMPANY NAME Stauffer Chemical Company

SUBMISSION PURPOSE Proposed label amendments adding lesser

cornstalk borer to the corn (field, sweet,  
and popcorn) use

SHAUGHNESSEY NO.

CHEMICAL, &amp; FORMULATION

% A.I.

041701

Fonofos (Dyfonate)

20

Dyfonate 20-G  
STAUFFER CHEMICAL COMPANY

100.0      Pesticide Use

Registrant is seeking to amend its current 20-G corn label adding the lesser corn stalk borer at rates up to 2.0 lbs a.i./acre.

100.1      Directions

Apply granular dyfonate at planting as a 6-8 inch band over corn rows 38 to 40 inches apart (10 pounds formulated product per acre - 12 oz per 1000 linear feet of row). Incorporate into the top 1/2 to 1 inch of soil by making application ahead of the press wheels, or by dragging a short piece of chain behind the press wheels.

100.3      Label Precautions

See proposed label - attached

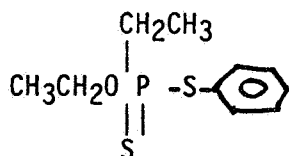
101.0      Chemical Properties      Chemical Name

O-Ethyl S-phenyl ethylphosphono dithioate

101.1      Common Name

Fonofos  
Dyfonate (trade name)

101.3      Structure



102.0      Behavior in the Environment

"Dyfonate was incorporated into the soil at the rate of 5.6 and 11.2 kg/ha as granules or emulsifiable concentrate; and its persistence and absorption by plants was observed. Four months after application, 33-35% of the granular application and 38-41% of the emulsifiable concentrate application (both 5.6 kg/ha) remained in the soil."

Metabolism of Pesticides Update II  
USDI Special Scientific Report No. 212

"Under Quebec, Canada, weather conditions (May-August), somewhat more than half of the fonofos applied to soil disappeared in about 4 months."

(Khan et al, 1976b). In other studies under subtropical conditions, only 36% of fonofos applied to soil was recovered after 6 weeks. The rate of degradation increased with subsequent application (Talekar et al, 1977 b)."

#### Metabolism of Pesticides

Update III

USDI Special scientific Report No. 232.

#### 103.0 Toxicological Properties

#### 103.1 Acute Toxicity

##### Mammals (Technical)

<sup>1</sup>Albino Rats.....13.2 mg/kg (male)

<sup>1</sup>Dogs.....3.4 mg/kg (female)

##### Birds

##### Acute Oral

LD<sub>50</sub>

<sup>1</sup>Bobwhite.....17.7 mg/kg (tech)  
.....574 mg/kg (10-G)

<sup>2</sup>Red-winged Blackbirds....10.0 mg/kg (tech)

##### Dietary

LC<sub>50</sub>

<sup>3</sup>Japanese Quail..... 295 ppm

<sup>3</sup>Ring-necked Pheasant.....270 ppm

<sup>3</sup>Bobwhite.....133ppm

<sup>3</sup>Mallard..... 1225 ppm

#### Fish

Rainbow Trout.....50 ppb (96-hr; Tech)

Bluegill.....29 ppb (96-hr, Tech)

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1 Undated, toxicological summary in branch files (Akerman).

2 Schafer, Edward W. et al. Toxicology and Applied Pharmacology, 21, 315-330, 1972.

3 USDI, Special Scientific Report No. 191

## 103.2 Long Term Laboratory Studies

### Fish

Bluegill were continuously exposed to fonofos (0.0017 mg/L) for 35 days. Subsequent transfer to uncontaminated water for 14 days.

- ~~No toxicological response~~
- C<sup>14</sup> label shows maximum accumulation in edible tissues (days 2-3) of 150x. Non-edible portions accumulated 7x the amount in edible portions.
- Transfer to "clean" water resulted in rapid depuration of residues: 20% of original in 3 days.

### Birds

Adult pharaoh quail (coturnix) were fed technical dyfonate at nominal dietary levels of 0,5,10, and 25 ppm for 14 and 28 days.

No significant differences in gross appearance, behavior, body weights or egg production. No significant residues were detected in liver, muscle, fat or eggs.

[Above data summarized from hand written, undated review in branch files (Akerman). No original data submitted or available in file.]

## 103.3 Field Studies

### (A) 30-Day Simulated field study (Wildlife International)

#### Bobwhite

	<u>Control</u>	<u>Dyfonate 10-G</u>	<u>20-G</u>
survival	12/12	11/12	11/12
% mortality	0	8.3*	8.3*

\*=differences not statistically significant

(B) 28-Day simulated Field study (Gary Booth/Brigham Young Univ.)

		<u>Bobwhite</u>		
(1)		<u>Control</u>	<u>10-G</u>	<u>20-G</u>
(Broadcast)	No. Birds	144	144	144
	% Mortality	0.7%	2.1%	*7.6%

\*= statistically significant ( $P < 0.05$ )

(ii)		<u>Bobwhite</u>			
(Band		<u>Control</u>		<u>20-G</u>	
Incorporation)	No. Birds	144		144	
		Male	Female	Male	Female
	% Mortality	4.2%	9.7%	0%	15.3%

(Differences not statistically different)

#### 104.0 Incremental Risk Assessment

##### Use Pattern

The registrant is seeking to add the lesser corn stalk borer to the corn uses currently labelled for Dyfonate 20-G. At present 1 lb a.i./A of Dyfonate 20-G may be soil-incorporated (banded) for rootworm, seed corn beetle and seed corn maggot. In Florida wireworm problems (muck soils) may be band treated to 2 lbs a.i./A. Broadcast applications for symphlans, wireworms and maize billbugs are labelled at rates of 2-4 lbs a.i./A.

The proposed corn stalk borer use would be at 2.0 lbs a.i./A as a band incorporated application.

##### Pest Distribution

Dr. Jim Todd (Univ. Georgia (912) 368-3374), who is conducting research on the lesser corn stalk borer, was contacted regarding the geographical distribution of this pest. He stated that it was largely a problem of the southeastern coastal plain, in particular, Georgia, Alabama and Florida. He indicated that the pest was severe enough in some areas that it might be the primary soil insect toward which control would be directed. He felt infestations were localized and associated with peanuts for which it is a more important pest.

Mr. Ed Butts, Stauffer Chemical Company (6-17-81), was contacted concerning geographical areas where the registrant anticipated less corn stalk borer problems and, therefore, product use. He reported the following states as possible use areas: Missouri, S. Illinois, S. Indiana, W. Arizona, central Tennessee, Arkansas, Mississippi, Louisiana, Alabama, N. Carolina, S. Carolina, Florida and Georgia.

Karl Ingebretsen, an Agronomist (corn) University of California at Davis (913-752-0570), was contacted concerning the distribution of the lesser corn stalk borer on the west coast. He reported that to his knowledge it was not a pest in California corn. Granular insecticides were typically not used in California corn he added. This same information was reported also by the Merced County Agricultural Extension office (209-726-7404).

### Endangered Species

A variety of granular carbofuran including uses, including corn, were recently referred to the Endangered Species Office. Their opinion (Hester, 5/1/81) indicated potential impact on 3 organisms: (1) Attwater's Prairie chicken (Texas) (2) Aleutian Canada Goose (California) (3) Kern Primrose Sphinx Moth (California).

At present the lesser corn stalk borer is not a pest in California thus no impact is foreseen as a result of the proposed use to the Aleutian Canada Goose or Kern Primrose Sphinx Moth.

Regarding the Prairie Chicken, for which exposure is a possibility (overlap exists between the bird's and the pest insect's geographical ranges), I feel the probability of significant impact is very low based on the following:

1. The O.E.S. opinion against carbofuran was based in part on the numerous bird kills associated with that chemical. No bird kills are known for Dyfonate despite widespread use for a number of years.
2. A thorough field study by G. Booth (see 103.3) showed that Bobwhite penned over soil-incorporated Dyfonate 20G experienced no measurable pesticide effects (Note that non-incorporated broadcast uses did cause significant mortality and ChE depression).
3. Carbofuran is 3x to 20x more acutely toxic than Dyfonate based on LD<sub>50</sub> values for species tested with both compounds:

<u>Technical Pesticide</u>	<u>Species</u>	<u>LD<sub>50</sub> mg/kg</u>	<u>Reference</u>
Dyfonate	Bobwhite	5.0	Tucker & Crabtree Registrant
Carbofuran	Bobwhite	17.7	
Dyfonate	Redwinged	10	Schafer, <sup>1</sup> Denver, USD
	Blackbird		
Carbofuran	Redwinged	0.42	Schafer, <sup>1</sup> Denver, USDI
	Blackbird		

<sup>1</sup>E.W. Schafer, Jr. and R.B. Brunton. 1979. Indicator Bird species for toxicity determinations: Is the technique Usable in test Development? ASTM STP 680, pp 157-168.

4. Recent research by the U.S. Fish and Wildlife Service (Progress Reports from the Patuxent Wildlife Research Center for the year 1980, USDI, 1981) indicates that a 3 year study (1978-80) of Attwater's prairie chickens found no mortality associated with pesticide treatments. Major hazards were identified as habitat loss, human disturbance, and collision with automobiles.

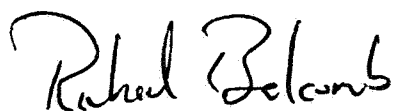
#### Summary

1. The current Dyfonate 20G corn label includes the major corn pests (rootworm, corn borer, wireworm etc) with use rates both above and below the proposed 2 lb a.i./A for lesser corn stalk borer.
2. The lesser corn stalk borer infestation in the southern Atlantic coastal plain may make Dyfonate attractive to users and result in additional use of this product.
3. No Fish and Wildlife data was submitted with this request but a review of information in EEB files indicates the following:
  - (A) The primary hazard associated with soil-incorporated granular insecticides is the acute poisoning of birds. Studies submitted previously by Stauffer for Dyfonate 20-G (Booth et al, 1980) indicate that though some mortality may occur this product is 'registerable' i.e. at reasonable use rates we would not anticipate large kills or population effects. Widespread use of Dyfonate has not resulted in a single reported wildlife kill.
  - (B) Fonofos is highly toxic to Fish (Bluegill 96-hour LC<sub>50</sub> - 29 ppb). A summary of a long term study (reviewed by Akerman - ? date) suggests that a 30-day exposure to Bluegills at 1.7 ppb had no adverse effects nor did it result in significant bioaccumulation.

As the addition of the lesser corn stalk borer to the label is expected to result in only limited expansion of the existing corn uses and that the proposed use pattern (in-furrow, soil-covered granules) should not be conducive to direct aquatic contamination, drift or runoff I find that the potential hazard to aquatic habitat is insufficient to either request additional data or reject this label change.

#### 105.0 Conclusions

The Ecological Effects Branch finds that the addition of the lesser corn stalk borer to the labelled corn pests for Dyfonate 20-G will not result in a biologically significant increase in fish and wildlife hazards.



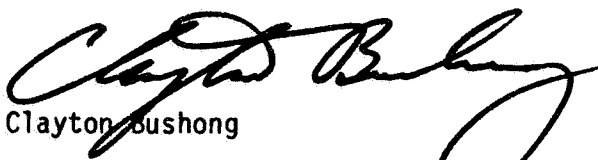
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