TO: Stubbs/Welsh
    Product Manager
    Registration Division
    TS-767

FROM: Samuel Creeger, Chief
      Review Section No. 1
      Exposure Assessment Branch
      Hazard Evaluation Division

Attached please find the environmental fate review of:

Reg./File No.: 84-OR-12

Chemical: Chlorothalonil

Type Product: Fungicide

Product Name: Bravo 500

Company Name: Oregon State Department of Agriculture

Submission Purpose: Emergency exemption for use on cranberry bogs.

ZBB Code: 3(c)(5)        ACTION CODE: 510
Date in: 4/19/84         EFB No. 4306
Date Completed: 4/24/84   TAIS (level II) Days

Deferrals To:
  _____ Ecological Effects Branch
  _____ Residue Chemistry Branch
  _____ Toxicology Branch.
1.0 INTRODUCTION

The Oregon State Department of Agriculture requested an Emergency Exemption (Section 18) for the use of Bravo 500 Fungicide (Chlorothalonil as a.i.) as a fungicide. The request is to treat an estimated 1,200 acres of cranberries for control of Lophodermium twig blight. The complete request is appended to this review.

1.1 Chemical

Common name: Chlorothalonil

Chemical name: Tetrachloroisophthalonitrile

Current uses: Chlorothalonil (Bravo 500) is currently registered for use on numerous field and orchard crops and on turf.

2.0 DIRECTIONS FOR USE

The directions call for 6-10 pints of Bravo 500 per acre (3.12-5.2 lbs. a.i./acre). Applications will be made at late bloom and will be repeated at 10-14 day intervals. Under severe disease conditions, the higher rate will be used on a 10 day schedule. Bravo 500 will not be applied more than three times per season, nor within 50 days of harvest. Bags will not be flooded until cranberries are to be harvested. Bravo 500 may be applied through solid set sprinkler irrigation systems.

With three applications and treating an estimated 1,200 acres of cranberries, 4,500 gallons of Bravo 500 will be required.

3.0 RECOMMENDATIONS

As yet, adequate data are not available to support the emergency use of chlorothalonil (Bravo 500) on cranberries in Oregon. There are questions still unanswered concerning the leaching of chlorothalonil (if, in fact, it does occur) and anaerobic soil metabolism.

Currently, data in-house awaiting review include a resubmitted aquatic field dissipation study and leaching data.

Clinton Fletcher
Review Section No. 1
Exposure Assessment Branch
Hazard Evaluation Division
March 27, 1984

Mr. Donald R. Stubbs, Section Head
Emergency Response Group (TS-767C)
Environmental Protection Agency
1921 Jefferson Davis Highway
ARLINGTON VA 22202

Dear Mr. Stubbs:

The Oregon Department of Agriculture requests approval of this application for a specific exemption under Section 18, FIFRA, as amended, in Part 166, Title 40, CFR 166.3 to use Bravo 500 fungicide for control of Lophodermium twig blight on cranberries.

1. Lophodermium twig blight, Lophodermium oxycocci, is a fungus which kills the fruit bearing stem of cranberry. Infection levels in western Oregon cranberry fields have reached 80-90% in several instances. Without adequate protection, crop reduction can be extreme.

2. The pest to be controlled is Lophodermium oxycoccii, commonly called Lophodermium twig blight.

3. Twig blight has become a chronic problem since the adoption of sprinkler irrigation. Wetting of the foliage causes the fruiting structures on the underside of leaves to release spores which infect the plant.

The Lophodermium twig blight infection period varies with each season's weather, but it usually occurs from late June through September with the peak danger period occurring during July and August. To control the pest, protection must be in place before the infection period occurs, and protection must be maintained throughout the infection period.

Based on several years of research in Oregon and Washington under the direction of Washington State University Plant Pathologist Dr. Peter Bristow, Mancozeb as Rohm and Haas Company's Dithane M-45 has been the most effective of these materials. However, Dr. Allan Stretch, Plant Pathologist, U.S. Department of Agriculture - Rutgers University, Blueberry-Cranberry Research Station, Chatworth, New Jersey, has observed that Mancozeb fungicides like Mancozeb may retard red color development in cranberry, an important quality characteristic.

In 1978, Oregon State University plant pathologists, under the direction of Bernard Moore, Plant Clinic Pathologist and Dr. Peter Bristow, conducted tests in a Southwest Oregon cranberry bog to evaluate the efficacy of Captan, Difolatan, Ferbam, Manet, and Zineb to control Lophodermium twig blight. No statistically significant differences were found with these materials.

Dr. Bristow's research has determined that Bravo 500 is superior to Mancozeb and Difolatan for control of Lophodermium twig blight. Fungicide trials at Long Beach, Washington, indicated that twig blight infestations when unsprayed (check) were 47.2% infection, late treatments with Difolatan had 36.7% infection, late treatments with Dithane M-45 had 27.1% infection, and early treatments with Bravo 500 had 14.8% infection. Storage rot was considerably less than with the other fungicides and Bravo 500 was also very effective in controlling Guignardia blight on cranberry.

5. Bravo 500 fungicide, common name Chlorothalonil (EPA Reg. No. 50534-8), active ingredient: tetrachloroisophthalonitrile, manufactured by SDS Biotech Corporation, is the pesticide intended to be used.

6. (a) Recommended application directions for Bravo 500: For cranberry Lophodermium leaf/twig blight, 6-10 pints of Bravo 500 will be applied per acre. Applications will be made at late bloom and repeated at 10-14 day intervals. Under severe disease conditions, the higher rate will be used on a 10 day schedule. Bravo 500 will not be applied more than three times per season, nor within 50 days before harvest. Fungicides will not be flooded until cranberries are to be harvested. Bravo 500 may be applied through solid set sprinkler irrigation systems.

No spreader-stickers or spray adjuvant will be added to the spray solution.

(b) Bravo 500 is formulated as a flowable product containing 4.17 pounds active ingredient per gallon. 6 ms/acre = 3.12 lbs. ai/A; 10 pts/acre = 5.2 lbs. ai/A.
A rate of 6-10 pints of formulated product is recommended per acre per application. Three applications are recommended; therefore, 18-30 pts/acre (2.25-3.75 gals/acre) will be needed. To treat an estimated 1,200 acres of cranberries, 4,500 gallons of Bravo 500 will be required.

(c) The period of application will be from June 1, 1984 to August 15, 1984.

(d) Applications will be made by certified commercial applicators or by growers using their own equipment.

(e) Bravo 500 is requested for the Oregon cranberry growing areas of Clatsop, Coos and Curry counties. Approximately 1,200 acres of cranberries are in production in this area. Over 900 acres were harvested in 1983; the remaining acreage is also susceptible to disease and total loss, even though the bogs are not yet into full production.

7. (a) Economic information concerning cranberries in Oregon: Approximately 90% of cranberry acres in Oregon have some level of twig blight infection (up to 90% infection in some bogs). It was estimated in 1983 that even with use of registered fungicides, 5% of the crop was lost to twig blight. Surveys of bogs conducted in February, 1984, by the Coos County Extension Specialist revealed that Lophodermium infection appears to exceed the level of a year ago. One bog with an estimated 10% infection level in 1983 now has an estimated 30% disease level.

(b) Economic benefits/losses expected: The 1983 Oregon cranberry crop was about 75,000 barrels. Assuming 80-90% control of Lophodermium with Bravo 500, an average 8% yield improvement would be expected, amounting to 6,000 barrels based on the 1983 crop. At an anticipated $46 per barrel, an economic benefit of $294,000 to the Oregon cranberry industry would be realized. This is an average benefit. Many farmers would realize much more than an 8% yield improvement. Losses on some bogs have reached 90%. Continued losses could force cranberry growers to take affected areas out of production. Since it takes five years for cranberries to reach peak yields, long-term economic effects could be expected.

(c) Crop yields over the past four years:

<table>
<thead>
<tr>
<th>Year</th>
<th>Barrels/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>104</td>
</tr>
<tr>
<td>1981</td>
<td>115</td>
</tr>
<tr>
<td>1982</td>
<td>80</td>
</tr>
<tr>
<td>1983</td>
<td>82</td>
</tr>
</tbody>
</table>
Mr. Donald R. Stubbs  
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(d) Crop production costs per acre for the past four years:

<table>
<thead>
<tr>
<th>Year</th>
<th>Cost ($/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>2,190</td>
</tr>
<tr>
<td>1981</td>
<td>2,460</td>
</tr>
<tr>
<td>1982</td>
<td>2,705</td>
</tr>
<tr>
<td>1983</td>
<td>2,932</td>
</tr>
<tr>
<td>1984 (est.)</td>
<td>3,095</td>
</tr>
</tbody>
</table>

(e) Price received for crop for past four years ($/barrel)

<table>
<thead>
<tr>
<th>Year</th>
<th>Price ($/barrel)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>533</td>
</tr>
<tr>
<td>1981</td>
<td>41</td>
</tr>
<tr>
<td>1982</td>
<td>47</td>
</tr>
<tr>
<td>1983</td>
<td>49</td>
</tr>
</tbody>
</table>

(f) Economic value of cranberry crop to Oregon for the past four years:

<table>
<thead>
<tr>
<th>Year</th>
<th>Value ($/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>2,700,000</td>
</tr>
<tr>
<td>1981</td>
<td>3,900,000</td>
</tr>
<tr>
<td>1982</td>
<td>2,990,000</td>
</tr>
<tr>
<td>1983</td>
<td>3,700,000</td>
</tr>
</tbody>
</table>

8. Estimation of percent control of the pest during 1984 with

(a) Registered pesticides: 40-60%
(b) Proposed pesticide: 80-90%

9. Bravo 500 is registered and used on tree and orchard crops as well as for control of Lophodermium needlecast on conifers in Oregon. No adverse effects to man or the environment have been found. Manufacturers data indicate that the chemical is relatively immobile in soils, that it should not contaminate waterways (no residues were detected in 20 groundwater or streamwater samples), and that it does not bioaccumulate in a model ecosystem.

It is our understanding that EPA is now reviewing an application for registration of Bravo 500 for use on cranberries (IR-4 Project No. PA1738).
Mr. Donald R. Stubbs  
March 27, 1984  
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10. Names and addresses of knowledgeable experts:

Mr. Arthur Poole  
Oregon State University  
Extension/Horticulture  
Coos County Extension Office  
290 N. Central  
Coquille, OR 97423  
(503) 397-3121, Ext. 240

Ms. Gwen Windom  
Western Washington Research & Extension Center  
Puyallup, WA 98371  
(206) 593-8529

Your prompt consideration for this request will be appreciated.

Sincerely,

Leonard Kunzman
Director  
(503) 378-4152

PL150-154  
cc: Arthur Poole  
Gwen Windom  
Charles Osgood  
Roger Sebek  
Lyn Frandsen  
Bill Kosesan