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SHAUGHNESSEY NO

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PRODUCT MANAGER, NO. Dennis Edwards (12)

PRODUCT NAME(S) Lorsban 50W

COMPANY NAME Dow Chemical Company

SUBMISSION PURPOSE Proposed registration for use on

blueberries

SHAUGHNESSEY NO.

CHEMICAL

% A.I.

Chlorpyrifos

1/9 206

ECOLOGICAL EFFECTS BRANCH REVIEW

Chlorpyrifos

100 Submission Purpose

The registrant, Dow Chemical proposes to add Blueberries to their Lorsban 50W label.

100.1 Pesticide Use

Insecticide

100.2 Formulation Information

Lorsban 50W is 50% chlorpyrifos.

100.3 Application Methods, Direction, Rates

Apply at 2 to 3 lbs formulation per acre (1 to 1.5 lbs ai). Make no more than 3 applications per season with a minimum 14-day between treatment interval. It is also being proposed for individual fire ant mound treatment by direct pouring.

Aerial treatment is not forbidden by the label; therefore, it is considered possible.

100.4 Target Organism

Aphids, blueberry (bb) fleabeetle, bb tip-borer, bb sawfly, cranberry (cb) fruitworm, cb girdler, cb weevil, cutworm, fireworm, leafroller, lecanium scale, spanworm, Sparganothis, bb maggot, plum curculio, fire ants.

100.5 Precautionary Labeling

ENVIRONMENTAL HAZARD

"This product is toxic to birds and wildlife and extremely toxic to fish and aquatic organisms. Do not apply directly to water. Drift and runoff from treated areas may be hazardous to aquatic organisms in adjacent aquatic sites. Cover or incorporate spills. Do not contaminate water when disposing of equipment washwater. This product is highly toxic to bees exposed to direct treatment or residues on blooming crops or weeds. Avoid use when bees are actively foraging or if bees are likely to come in contact with wet or re-wetted treated surfaces. Protective Information may be obtained from your cooperative Extension Service. this product may pose a hazard to certain Federally endangered fish species. Refer to the endangered species section of this label for any geographic restrictions."

101 Hazard Assessment

101.1 Discussion

According to the 1982 Census of Agriculture, blueberries are grown in the following states and counties.

BLUEBERRIES

Total US Acreage 37,247

<u>States</u> <u>(Acres)</u>	<u>Counties with</u> <u>most production</u>
Michigan (13712)	Allegan Berrien Muskegan Ottawa Van Buren
New Jersey (7768)	Atlantic Burlington Camden Monmouth
North Carolina (3032)	Bladen Pender Sampson
Maine Tame(2426) Wild(21186)	Washington Hancock Knox Waldo Lincoln
Georgia (1740)	Atkinson Clinch
Oregon (1310)	Washington Marion Clackamas

Once an area is placed into blueberry production, it is likely to remain such for several years since perennial growth is required for berry production.

101.2 Likelihood of Adverse Effects to Nontarget Organisms

Ecological Concern Levels

(Extracted from 12-20-88 Science Chapter)

<u>Birds</u>	LD50=5.62 mg/kg (1-day LC50=56.2 ppm ¹) 5-day LC50=136 ppm Reproduction NOEL=25 ppm Field rates as low as 0.1 lb. ai/acre lethal
<u>Mammals</u>	LD50=137 mg/kg (1-day LC50=1370 to 548 ppm ¹) 28-day survival NOEL=15 ppm 3-generation rep. NOEL=10 ppm
<u>Fish</u>	LC50=3 ppb (freshwater species) LC50=0.42 ppb (estuarine species) Full life cycle rep. LEL=0.12 ppb NOEL<0.12 ppb Direct appl. of 0.01 and 0.05 lb/A lethal
<u>Aqu. Inv.</u>	LC50=0.11 ppb Life cycle NOEL>0.04<0.08 ppb Direct appl. of 0.01 lb/A lethal shrimp LC50=0.035 ppb mollusk EC50=34 ppb
<u>Plant</u>	140 ppb hazardous to algae

Terrestrial

The use of chlorpyrifos at 1.5 lbs ai/acre is likely to result in the following residues (ppm) on terrestrial food items.

¹ Assumes bird consumes 10% of its bodyweight per day, and mammals consume 5 to 25% of their body weight per day.

	<u>short</u> <u>grass</u>	<u>long</u> <u>grass</u>	<u>leafy</u> <u>crops</u>	<u>insects</u> <u>forage</u>	<u>seed</u> <u>Pods</u>	<u>fruit</u>
max.	360	165	187	87	18	10
typ.	187	138	52	49	4	2

The maximum residues on food items exceed the avian 5-day LC50 and the 1-day LC50 extrapolated from an acute oral LD50 for songbirds. Therefore, these residues are high enough to be acutely hazardous to birds. Since multiple applications are permitted, chronic exposure is anticipated. Concentrations exceed the avian reproductive NOEL. The residues do not exceed mammalian acute effect levels; however, they do exceed the 30-day NOEL and the 3-generation NOEL. Therefore, chronic effects to mammals are possible.

Terrestrial field testing for effects to birds is required in the reregistration guidance document for grapes or cherries treated with chlorpyrifos. This testing will also be required for this proposed additional use on blueberries.

Aquatic

Based on the results of a residue monitoring study (McCall et al. 1984, 253708), concentrations (ppb) of chlorpyrifos in a water body receiving runoff from a field treated with 1.5 lb ai/acre may be calculated.

<u>Appl</u> <u>Rate</u>	<u>within</u> <u>12 days</u>	<u>12 - 30</u> <u>days</u>	<u>30-100</u> <u>days</u>
1.5 lbs/A	0.37	0.10	0.07

This does not exceed 1/2 the freshwater fish 96-hour LC50 (3 ppb/2=1.5 ppb). Therefore, acute effects to fish are not anticipated. However, the concentrations with the first 12 days exceed the fish LOEL of 0.12 ppb. Since repeat applications are permitted, this concentration could occur repeatedly resulting in chronic exposure to concentrations exceeding the fish chronic LOEL. Safety to fish cannot be concluded.

The concentration within the first 12 days exceeds the 48-hour LC50 for Daphnia magna (LC50=0.11 ppb). Chronic exposure levels (due to persistence and repeat application) also exceed the D. magna life cycle NOEL of 0.04 ppb. Acute and chronic effects to freshwater invertebrates are expected.

Aquatic field testing is being required in the reregistration guidance for various uses of chlorpyrifos. This testing would be required for the blueberry use.

Summary

The use of chlorpyrifos on blueberries at 1.5 lbs ai/acre is expected to impact birds, fish and aquatic invertebrates.

101.3 Endangered Species Considerations

Triggers

<u>Birds</u>	acute oral: 0.562 mg/kg (for granulars) (1/10th the LD50 of 5.62 mg/kg) 5-day dietary: 13.6 ppm (1/10th the LC50 of 136 ppm) Reproduction NOEL: 25 ppm Field rates as low as 0.1 lb. ai/acre lethal
<u>Mammals</u>	Acute AChE inhibition effect level: 5 mg/kg ² 1-day dietary AChE effect level: 50 ppm 1-day dietary: 54.8 to 137 ppm (1/10th 1-day LC50 of 548 to 1370 ppm) 3-generation rep. NOEL: 10 ppm
<u>Fish</u>	acute: 0.15 ppb (1/20th the LC50 of 3 ppb) Full life cycle rep. LEL=0.12 ppb NOEL<0.12 ppb Direct appl. of 0.01 and 0.05 lb/A lethal
<u>Aqu. Inv.</u>	acute: 0.006 ppb (1/20th the LC50 of 0.11 ppb) Life cycle NOEL>0.04<0.08 ppb Direct appl. of 0.01 lb/A lethal
<u>Mollusk</u>	acute: 1.7 ppb (1/20th the EC50 of 34 ppb)
<u>Plants</u>	minimal concern because chlorpyrifos is registered on numerous crops

Chlorpyrifos is not expected to affect any endangered plant species because it is registered on some many different agricultural crops representing a great variety of plant types. It is not considered phytotoxic.

The following endangered species occur in the counties where blueberries are grown, (see list above).

² Cholinesterase inhibition is considered an adverse effect that should be avoided for endangered mammals. Therefore, the level expected to cause acute cholinesterase inhibition is used as the endangered species trigger.

Indiana bat: No effect expected since these bats tend to feed on aquatic insects, and chlorpyrifos would be applied to terrestrial habitats. It is possible that chlorpyrifos would transport to aquatic habitats by drift or runoff; however, not enough is expected to be taken up by insects to secondarily affect bats.

Eastern cougar: No effect since chlorpyrifos is not expected to bioaccumulate enough to result in secondary poisoning.

Bald Eagle: No effect since chlorpyrifos is not expected to bioaccumulate enough to result in secondary poisoning.

Red cockaded woodpecker: No effect since these birds feed on insects on and under the bark of trees. These insects would not be expected to be exposed to chlorpyrifos.

Wood stork: No effect since chlorpyrifos is not expected to bioaccumulate enough to result in secondary poisoning. The chronic effects to fish are not expected to be sufficient to result in reduction of food supply for this bird.

Northern spotted owl: No effect since chlorpyrifos is not expected to bioaccumulate enough to result in secondary poisoning.

Piping plover: No effect since this species feeds primarily on aquatic invertebrates and chlorpyrifos is unlikely to transport to aquatic habitat from the blueberry use in sufficient quantities to result in hazardous concentrations in invertebrates. Neither is this use likely to affect invertebrate populations to the extent that plovers would suffer from reduced food supply.

Roseate tern: No effect since chlorpyrifos is not expected to bioaccumulate enough to result in secondary poisoning.

Eastern indigo snake: No effect since chlorpyrifos is not expected to bioaccumulate enough to result in secondary poisoning.

Shortnose

sturgeon: No effect since from use of chlorpyrifos on blueberries is not expected to reduce populations of fish.

The use of chlorpyrifos on blueberries is not expected to affect endangered species.

101.4 Adequacy of Toxicity Data

The data are adequate to show that use of chlorpyrifos on blueberries is likely to impact nontarget organisms including birds, fish and aquatic invertebrates. Additional testing is required to negate these concerns. This includes both terrestrial and aquatic field testing.

101.5 Adequacy of Labeling

The label statement should include the following wording.

ENVIRONMENTAL HAZARD

"This pesticide is toxic to birds and wildlife and extremely toxic to fish and aquatic organisms. Do not apply directly to water or wetlands (swamps, bogs, marshes and potholes). Cleanup spilled product to reduce exposure to wildlife. Drift and runoff from treated areas may be hazardous to aquatic organisms in adjacent aquatic sites. Do not contaminate water when disposing of equipment washwater or rinsate.

"This product is highly toxic to bees exposed to direct treatment or residues on blooming crops or weeds. Avoid use when bees are actively foraging. Protective Information may be obtained from your cooperative Extension Service."

103 Conclusion

The EEB has reviewed the proposed label change to include blueberries. Based on available information, the use of chlorpyrifos at 1.5 lb ai/acre is expected to result in adverse effects to terrestrial and aquatic organisms. These include acute and chronic effects to birds and aquatic invertebrates and chronic effects to fish and mammals. No additional data, beyond those identified in the reregistration guidance document, are required specifically for this label change. The results of such testing will apply to this use.

The EEB recommends that the required testing identified in the reregistration guidance document be conducted before any new outdoor uses of chlorpyrifos be considered for registration.

No effects to endangered species are expected.

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