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PRODUCT NAME(S) ASANA

COMPANY NAME Washington Dept. Agricultura

SUBMISSION PURPOSE Sec 18 - use on cranberries

SHAUGHNESSEY NO.	CHEMICAL, & FORMULATION	% A.I.
	ES-Fenvalerate	

100.1 **Submission Purpose**

The Washington Department of Agriculture is requesting an emergency exemption (Section 18) for the use of ASANA to control black vine weevils on cranberries.

100.2 **Application Rate/Method/Directions**

ASANA is to be applied post-bloom by ground sprayer at not more than 2 applications per year. Rate of application is 0.05 lb ai/A.

100.3 **Target Organisms**

Black vine weevil, *Otiorhyncus sulcatus* (fabricius)

100.4 **Precautionary Labeling**

This pesticide is toxic to wildlife and extremely toxic to fish. Use with care when applying in areas adjacent to any body of water. Do not apply directly to water. Do not apply when weather conditions favor drift from treated areas. Do not contaminate water by cleaning of equipment or disposal of wastes. Apply this product only as specified on this label.

101.0 **Hazard Assessment**

The State of Washington is requesting an emergency exemption for the use of ASANA on cranberry fields to combat black vine weevil. This request is only for dry harvested fields and not for bogs that are flooded at harvest.

101.1 **Likelihood of Adverse Effects to Nontarget Organisms**

Although the acute/chronic fish and wildlife data base for ASANA is not complete, studies have shown that this isomer of fenvalerate appears to have similar fate and toxicity parameters as the parent compound. Therefore, the Agency will rely upon the fenvalerate data base in evaluating the potential hazard of ASANA use to nontarget terrestrial and aquatic organisms.

Aquatic Toxicity

Fenvalerate, a second generation pyrethroid, degrades in soil with a half-life of six months and undergoes hydrolysis after 24 days at ph 7.2. Fenvalerate can strongly bind to sediment/particulate and result in a soil/water partition coefficient of greater than 15,000.

Fenvalerate is a neurotoxicant and effector of ion permeability (Miller and Adams 1982) and appears to interact with sodium gates (Lawrence and Casida 1983). Laboratory testing has shown that fenvalerate is very highly toxic to freshwater aquatic organisms as noted in acute toxicity values that ranged from 0.032 ug/L (Daphnia magna) to 2.35 ug/L (fathead minnow) (Mayer and Ellersieck 1986). This very high toxicity has also been documented in acute marine studies. Schimmel et al. (1983) found that fenvalerate was acutely toxic to mysid shrimp, Mysidopsis bahia at 0.008 (0.005 - 0.01) ug/L and pink shrimp, Penaeus duorarum, at 0.84 (0.66 - 1.2) ug/L. They further found that acute toxicity values for estuarine fish ranged from 5.0 (0.55 - 5.3) ug/L for sheepshead minnow, Cyprinodon variegatus, and 0.31 (0.21 - 0.40) ug/L for Atlantic silversides, Menidia menidia.

An evaluation of sublethal fenvalerate exposure to aquatic invertebrate larval development and metabolism was conducted by McKenney and Hamaker (1984). They concluded that exposure to 0.0001 and 0.0002 ug/L can result in alterations in metabolic-salinity patterns of larval grass shrimp Palemonetes pugio. This reduces ecological fitness at this critical life stage by limiting the organism's capacity to adapt to fluctuating salinity conditions that are normally encountered in estuarine waters.

An assessment of the potential environmental risk of a pesticide must include actual or estimated values of exposure. Smith et al. (1983) noted that fenvalerate concentration in runoff from a sugarcane-insect IPM system could present a toxicity problem to aquatic organisms. Although the toxicity of fenvalerate may be reduced as a result of sorption to sediment, this reduction was only 2-fold, and does not eliminate aquatic hazard.

The Ecological Effects Branch (EEB) has calculated estimated environmental concentrations (EEC) of ASANA residues on cranberries following ground application (Appendix I). These calculations suggest that at 0.05 lb ai/A (highest application level) the expected concentration of ASANA from this type of application is 0.03 ug/L. A comparison of this estimate with acute and chronic toxicity values suggests that ASANA use on cranberries may result in environmental residues that exceed aquatic toxicity concerns, especially to aquatic invertebrates, through runoff from fields adjacent to aquatic systems.

Avian Toxicity

The available data suggests that fenvalerate is practically non-toxic to birds at an acute level (Mallard LC_{50} = 10,000 ppm). However, avian reproductive effects were found at 25 ppm. In assessing acute toxicity of ASANA to avian wildlife, EEB has estimated the potential exposure from residues by using Hoerger and Kenaga (1972) table of typical maximum residues on differing categories of vegetation (Table 1).

Table 1. Maximum Expected Fenvalerate Residues on Avian Food and Dietary Intake (ppm) after an Application of 0.05 lb ai/A

Food Type	Reside (ppm)
Short Grass	14.0
Dense Foliage/ Small Insects	2.8
Large Insects	0.1

The maximum expected residues from the consumption of vegetation and insects (application rate of 0.05 lb ai/A) are expected to range from 0.1 to 14.0 ppm. These values show that ASANA use on cranberries should not present a direct toxicity threat to birds since the expected residues are 6 to 3 orders of magnitude less than avian toxicity values. However, there is a possibility of indirect effects through ASANA exposure to aquatic invertebrates that serve as a food base for waterfowl. Since, ASANA is very toxic to aquatic organisms, runoff from sprayed fields could affect a significant trophic level that certain waterfowl are dependent upon, especially during breeding.

ASANA has the potential for toxic impact of aquatic ecosystems, as well as, causing indirect effects to waterfowl. However, EEB believes that the emergency use described by the Washington Department of Agriculture should not result in a significant incremental risk to aquatic systems because of a limited exposure resulting from the following considerations: 1) only 500 acres to be sprayed; 2) no direct contact with aquatic environment (dry harvested cranberry fields will be sprayed and not bogs that are flooded; 3) minimum risk of pesticide impacting aquatic system via drift (only ground application to be used). These factors appear to mitigate potential exposure of ASANA to wildlife and aquatic organisms.

101.2 Endangered Species

Based upon the information found in the EEB Endangered Species file, no endangered species should be impacted by this use of ASANA in the designated counties of Pacific and Grays Harbor.

107.0 Conclusions

EEB has completed its evaluation of this Section 18 request for the use of ASANA on cranberry in Washington. Expected environmental residues were calculated in order to assess the potential hazard of ASANA to avian and aquatic species. The expected residues from field runoff exceed acute/chronic toxicity values for fish and aquatic invertebrates by one to three orders of magnitude. However, EEB believes that the emergency use described by the Washington Department of Agriculture should not result in a significant incremental risk to wildlife and aquatic organisms because of a limited exposure potential that reflects the following considerations: 1) only 500 acres are to be sprayed; 2) no direct contact with aquatic environment is expected (dry harvested cranberry fields will be sprayed and not bogs that are flooded; 3) minimum risk via drift (only ground application to be used). Although, ASANA has the potential for toxic impact of aquatic ecosystems, as well as, causing indirect effects to waterfowl, the factors previously outlined in this paper should mitigate any risk with regard to this emergency use.

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Appendix I - EEC Calculations for ASANA Use on Cranberries

I. Ground Application

Assumptions:

0.1% runoff
10 acre drainage basin
0.05 lb ai/A of ASANA

(A) Runoff

0.05 lb ai/A x 0.001 x 10 A = 0.0005 lbs ai total runoff

EEC of 1 lb ai, direct application to 1 A pond, 6-ft. deep = 61

$$\text{Therefore, EEC} = \frac{61 \text{ ug/L}}{} \times \frac{0.0005 \text{ lb ai}}{1 \text{ lb ai}} = 0.03 \text{ ug/L}$$

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