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109303
SHAUGNESSEY NO.

M. Rexrode
TAIS PPA #305

19
REVIEW NO.

EEB REVIEW

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

DATA ACCESSION NO(S). -

PRODUCT MANAGER NO. 15

PRODUCT NAME(S) Asana XL Insecticide

COMPANY NAME DuPont

SUBMISSION PURPOSE Review Proposed Use on alfalfa & lettuce

SHAUGNESSEY NO.	CHEMICAL, & FORMULATION	% A.I.
109303	ES-FENVALERATE	

100.0 Chemical: ASANA

100.1 Submission: DuPont is requesting registration of ASANA XL Insecticide 0.66 EC for use on alfalfa and head lettuce.

100.2 Application Rate: A rate of 0.025-0.05 lb ai/A are to be applied as needed but not to exceed 0.05 lb ai/A per cutting. ASANA can be applied by ground or aerial equipment.

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.

100.5 Hazard Assessment:

DuPont is requesting registration of ASANA for use on alfalfa and head lettuce. Alfalfa composes about 25 million acres in the U.S., while, lettuce accounts for about 221,000 acres.

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, Coulon (1982) found that 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 alfalfa following ground and aerial application (Appendix I). These calculations suggest that at 0.05 lb ai/A (highest application level) the expected concentration of ASANA from both types of application are 0.03 and 0.154 ug/L, respectively. A comparison of these estimates with acute and chronic toxicity values suggests that ASANA use on alfalfa may result in environmental residues that exceed aquatic toxicity concerns, especially to aquatic invertebrates, through runoff and drift from fields adjacent to aquatic systems.

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Avian Toxicity

The available data suggests that fenvalerate is practically non-toxic to birds at an acute level (Mallard LC_{50} = 9932 ppm; Bobwhite quail 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 on Alfalfa

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 winter wheat 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, drift or runoff from sprayed fields could affect a significant trophic level that certain waterfowl are dependent upon, especially in the spring during breeding.

107.0 Conclusions:

EEB has partially completed its evaluation of this registration for the use of ASANA on alfalfa and lettuce. Expected environmental residues were calculated in order to assess the potential hazard of ASANA to avian and aquatic species. These calculated residues appear to exceed acute/chronic toxicity values for fish and aquatic invertebrates by one to three orders of magnitude. Although, this use of ASANA should not be directly toxic to birds, there is a possibility of indirect effects through the impacting of an invertebrate food base that waterfowl are dependent upon. However, the completion of a risk assessment for these ASANA uses has been postponed by EEB until the required mesocosm study is submitted and evaluated. Any expansion of the ASANA registration could possibly result in an increase risk to wildlife and aquatic organisms.

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Appendix I - EEC Calculations for ASANA Use on Alpha

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
Therefore, EEC = 61 ug/L x 0.0005 lb ai = 0.03 ug/L
1 lb ai

II. Aerial Application

Assumptions

0.1% runoff
60% application efficiency
10 acre drainage basin
5% drift
0.05 lb ai/A of ASANA

(A) Runoff

0.05 lb ai/A x 0.6 x 0.001 x 10 A = 0.0003 lb ai found in total runoff

(B) Drift

0.05 ai/A x 0.05 = 0.0025 lbs ai in total drift

Therefore, EEC = 61 ug/L / 1 lb ai x 0.0025 lb ai / 1 = 0.154 ug/L

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