

Review of New Use: October 15, 1999

SUBJECT: Cyromazine (121301): Lima Beans

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The Environmental Risk Branch III has completed the review of the proposal to use cyromazine on lima beans at 0.125 lb ai/acre, with up to 6 applications at 7 day intervals. Risk was assessed as if it may be applied both by ground and aerial equipment. However, given the screening models used, and the fact that risk to non-target organisms was limited to chronic effects to birds, it made no difference in the risk conclusions whether aerial or ground application was assumed.

Since this application rate is identical to previously reviewed uses (celery and potatoes), the results from that assessment are applicable to this proposed use. The conclusions from that review are provided below, please see the EFED review completed under the barcodes D219201, D250731, D251321 dated August 9, 1999.

Risk Overview

Cyromazine is persistent and mobile. Furthermore, it has a primary degradate, melamime, that is even more persistent and mobile than cyromazine. With multiple applications and usage year after year, cyromazine and its degradate melamime may build up in environmental compartments. Both the parent and degradate are expected to get into ground and surface water. In a small scale ground water monitoring study in Florida, no cyromazine was measured, but melamime was detected. With multiple applications, cyromazine potentially represents a chronic risk to birds including endangered birds. Other organisms are not expected to be at risk.

Environmental Fate

Based on previously submitted data, cyromazine is stable to hydrolysis and photolysis, and is quite persistent in aerobic soil ($t_{1/2} \approx 150$ days). This was confirmed in the field studies, where dissipation half-lives were more than 250 days. Soil adsorption coefficients are generally low, with Freundlich adsorption coefficients (K_{f-ads}) less than 5 for the three tested mineral soils (sand, silty clay loam, and silt loam). This would indicate that cyromazine has the potential to leach through soils, especially sand, silty clay, and silt loam. Melamine was identified as the primary degradate of cyromazine. The persistence ($t_{1/2}$), adsorption (K_d), and dissipation rate of melamine have not been specified, but in terrestrial field studies, melamine is shown to be more persistent and mobile than the parent, and may accumulate in soil with repeated uses. Two other degradates were also noted, but not identified.

Ground and Surface Water Concerns

A small-scale prospective ground-water study on tomatoes in Florida showed no cyromazine residues in ground-water. However, low levels of melamine, the primary degradate, were detected in shallow ground water. Available environmental fate data also indicate that cyromazine and its degradate (melamine) have potential to accumulate in soils and leach into ground water over repeated applications and years of uses.

Drinking Water EECs

Drinking water values of cyromazine were estimated using GENEEC (surface water) and SCI-GROW (ground water) models. A detailed Tier I drinking water assessment was issued by James K. Wolf, Ph.D. on December 18, 1997. No assessment was performed on melamine, the major degradate of cyromazine, due to incomplete environmental fate database. However, available fate and monitoring data indicate that melamine could be more persistent and mobile than the parent cyromazine. The following drinking water EECs were taken from Dr. Wolf's December 18, 1997 assessment.

Ground Water Modeling

The SCI-GROW (Screening Concentration in Ground Water) screening model developed in EFED (Barrett, 1997) was used to estimate potential ground water concentrations for cyromazine under hydrologically vulnerable conditions. The maximum cyromazine ground water concentration predicted by SCI-GROW based on the maximum rate of 0.125 lb. a.i./A and 6 maximum applications per year was 1.63 µg/L.

Surface Water Modeling

The GENEEC program for surface water estimates a peak EEC value of 28.7 ppb and an average 56-day value of 27.5 ppb. These estimates for cyromazine were based on a 0.125 lb ai/A per application, 6 maximum applications per year, a K_{oc} of 106 mL/g, a spray drift of 5 %, and an aerobic half-life of 150 days (sandy loam). When only one aerobic soil metabolism half-life value is available, EFED multiplies this value times three to account for uncertainty and variability. Since the aerobic soil metabolism half-life is relatively long (150 days), multiplying the value times three ($3 \times 150 = 450$ days) is considered highly conservative. Aquatic degradation data were not available, so, for modeling purposes, it was assumed cyromazine did not metabolize in aquatic systems.

GENEEC estimates of surface water concentrations for cyromazine.

Half-life (days)	Max Application rate (lb ai/A) / interv (day)	Cyromazine Concentration (µg/L)			
		Peak	4-Day Mean	21-Day Mean	56-Day Mean
150	0.125/6	28.7	28.6	28.2	27.5
450	0.125/6	30.1	30.0	29.6	28.9

Ecological Risks

Although the proposed application rate for cyromazine use on lima beans is relatively low, the persistence of this chemical in the environment and the repeated uses could pose chronic risk to birds after 3 applications. Following the requested 6 applications the Rq for short grass was 1.66 and for broadleaf/insects, 0.94 -- just slightly under the LOC of 1. Please see EFED review dated August 9, 1999.

No other LOCs (both chronic and acute) were exceeded. Other organisms are not considered to be at risk.

Endangered Species Concerns

There is a potential risk to endangered avian species that consume vegetation and invertebrates containing maximum residues after 3 or more foliar applications of cyromazine. A list of potentially affected Federally listed endangered or threatened bird species is attached. The list identifies avian species that occur in counties where there are 100 acres or more of lima beans.

Norvartis is a member of the FIFRA Endangered Species Task Force. Any risk that cannot be mitigated should be addressed by providing endangered species locality information via the Task Force. Because the Task Force is not yet generating such information, Norvartis should be encouraged to propose mitigation measures to protect endangered birds potentially exposed from the use of cyromazine on celery and potatoes.

Labeling

The labeling recommended in the previous review dated August 9, 1999 is applicable to this use.

If you have questions concerning this review, please contact Daniel Rieder at 305 5314.

ENDANGERED SPECIES ATTACHMENT

Species not at risk

The following species were removed from the computer generated list. The EFED concludes that because their food habits, and the level of risk (i.e. maximum residues on vegetation exceed the LOC) they are unlikely to be affected:

NORTHERN SPOTTED OWL: Eats only prey species; cyromazine is not expected to bioaccumulate. Hazardous exposure to the spotted owl is unlikely.

CALIFORNIA CONDOR: Eats only carcasses; cyromazine is not likely to occur in bodies of animals (carcasses) at hazardous levels.

BROWN PELICAN: Eats only fish, and cyromazine is unlikely to accumulate in the bodies of fish at hazardous levels.

Species that may be affected

BUTTE CA Dry lima beans, Harvested (acr ACREAGE = 404

SPECIES	GROUP	STATUS	KNOWN
GOOSE, ALEUTIAN CANADA	BIRD	T	POSSIBLE

COLUSA CA Dry lima beans, Harvested (acr ACREAGE = 2256

SPECIES	GROUP	STATUS	KNOWN
GOOSE, ALEUTIAN CANADA	BIRD	T	KNOWN

KERN CA Dry lima beans, Harvested (acr ACREAGE = 270

SPECIES	GROUP	STATUS	KNOWN
FLYCATCHER, SOUTHWESTERN WILLOW	BIRD	E,CH	POSSIBLE
VIREO, LEAST BELL'S	BIRD	E,CH	KNOWN

MERCED CA Dry lima beans, Harvested (acr ACREAGE = 2795

SPECIES	GROUP	STATUS	KNOWN
GOOSE, ALEUTIAN CANADA	BIRD	T	POSSIBLE

MONTEREY CA Dry lima beans, Harvested (acr ACREAGE = 1766

SPECIES	GROUP	STATUS	KNOWN
MURRELET, MARBLED	BIRD	T/CH	POSSIBLE
PLOVER, WESTERN SNOWY	BIRD	T	KNOWN
RAIL, CALIFORNIA CLAPPER	BIRD	E	POSSIBLE
TERN, CALIFORNIA LEAST	BIRD	E	POSSIBLE
VIREO, LEAST BELL'S	BIRD	E,CH	POSSIBLE

SAN DIEGO CA Dry lima beans, Harvested (acr ACREAGE = 350

SPECIES	GROUP	STATUS	KNOWN
FLYCATCHER, SOUTHWESTERN WILLOW	BIRD	E,CH	POSSIBLE
GNATCATCHER, COASTAL CALIFORNIA	BIRD	T	KNOWN
GOOSE, ALEUTIAN CANADA	BIRD	T	POSSIBLE
MURRELET, MARBLED	BIRD	T/CH	POSSIBLE
PLOVER, WESTERN SNOWY	BIRD	T	KNOWN
RAIL, LIGHT-FOOTED CLAPPER	BIRD	E	KNOWN
TERN, CALIFORNIA LEAST	BIRD	E	KNOWN
VIREO, LEAST BELL'S	BIRD	E,CH	KNOWN

SAN JOAQUIN CA Dry lima beans, Harvested (acr ACREAGE = 7609

SPECIES	GROUP	STATUS	KNOWN
GOOSE, ALEUTIAN CANADA	BIRD	T	POSSIBLE

SANTA BARBARA CA Dry lima beans, Harvested (acr ACREAGE = 5896

SPECIES	GROUP	STATUS	KNOWN
GOOSE, ALEUTIAN CANADA	BIRD	T	POSSIBLE
MURRELET, MARBLED	BIRD	T/CH	POSSIBLE
PLOVER, WESTERN SNOWY	BIRD	T	KNOWN
RAIL, LIGHT-FOOTED CLAPPER	BIRD	E	KNOWN
TERN, CALIFORNIA LEAST	BIRD	E	KNOWN
VIREO, LEAST BELL'S	BIRD	E,CH	KNOWN

STANISLAUS CA Dry lima beans, Harvested (acr ACREAGE = 15340

SPECIES	GROUP	STATUS	KNOWN
GOOSE, ALEUTIAN CANADA	BIRD	T	KNOWN

SUTTER CA Dry lima beans, Harvested (acr ACREAGE = 5044

SPECIES	GROUP	STATUS	KNOWN
GOOSE, ALEUTIAN CANADA	BIRD	T	KNOWN

VENTURA CA Dry lima beans, Harvested (acr ACREAGE = 300

SPECIES	GROUP	STATUS	KNOWN
PLOVER, WESTERN SNOWY	BIRD	T	KNOWN
RAIL, LIGHT-FOOTED CLAPPER	BIRD	E	KNOWN
TERN, CALIFORNIA LEAST	BIRD	E	KNOWN
VIREO, LEAST BELL'S	BIRD	E,CH	KNOWN