6-28-93

Date Out: ~~6/23/93~~

Chemical Code:113501
DP Barcode:174399

ENVIRONMENTAL FATE AND GROUND WATER BRANCH

Review Action

To: Rebecca Cool, PM #41
Registration Division (H7505C)

From: Elizabeth Behl, Head
Ground-Water Technology Section
Environmental Fate & Ground Water Branch/EFED (H7507C)

Thru: Henry Jacoby, Chief
Environmental Fate & Ground Water Branch/EFED (H7507C)

Attached, please find the EFGWB review of...

Common Name:	metalaxyl	**Trade name:**	Ridomil 5-G
Company Name:	Ciba-Geigy		
ID #:	ID# 92WI0004		
Purpose:	Section 18 Exemption - determine if exemption would cause ground-water concerns		

Type Product:	Action Code:	EFGWB #(s):	Review Time:
Fungicide	510 SEC 18	92-0526	2.0 day

STATUS OF STUDIES IN THIS PACKAGE:

Guideline #	MRID	Status[1]
none		U

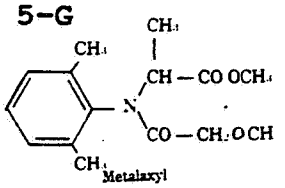
STATUS OF DATA REQUIREMENTS ADDRESSED IN THIS PACKAGE:

Guideline #	Status[2]
	P

[1]Study Status Codes: A=Acceptable U=Upgradeable C=Ancillary I=Invalid.
[2]Data Requirement Status Codes: S=Satisfied P=Partially satisfied N=Not satisfied R=Reserved W=Waived.

1. CHEMICAL: Common name: metalaxyl
Chemical name: N-(2,6-Dimethylphenyl-N-(methoxyacetyl)alanine methyl ester
Trade name: Ridomil 5-G

Structure:



Metalaxyl

2. TEST MATERIAL: N/A

3. STUDY/ACTION TYPE: Section 18 Emergency Exemption - for use of Ridomil 5-G on ginseng in Wisconsin.

4. STUDY IDENTIFICATION: Letter from E. Bergman to R. Cool requesting a Section 18 Emergency Exemption to control Phytophthora root rot on ginseng in Wisconsin. "Application for a Specific Exemption for the Use of the Fungicide Ridomil 5-G on Cultivated Ginseng in 1992", by Edward A.Bergman, Wisc. Dept. Agr. and Consumer Protection.

5. REVIEWED BY:

John Jordan, Ph.D.
Microbiologist
OPP/EFED/EFGWB/Ground-Water Section

Signature: John Jordan Date: 6/22/93

6. APPROVED BY:

Elizabeth Behl, Head
OPP/EFED/EFGWB Ground-Water Section

Signature: D A Wells Date: 6/25/93

7. CONCLUSIONS:
The Ground-Water Section concurs with the proposed Section 18 use of Ridomil 5-G on ginseng in Wisconsin for the 1993 crop season, only. In Wisconsin, ginseng is grown on the heavier clay soils in 53 Wisconsin Counties. Approximately 3,000 acres of ginseng are under cultivation, but only approximately 1,000 acres are harvested each year. There are 1,762 growers, and the size of the cultivated ginseng plots are small because of the intensive labor required. Because of the clay type soils used for ginseng cultivation, the low total ginseng acreage, small plot size and the dispersed nature of the total ginseng acreage, the potential for ground-water contamination from this specific use is low.

Although the contamination potential for the one-time use of this compound is low, repeated use of Ridomil 5-G increases our level of concern.

8. RECOMMENDATIONS:

Because metalaxyl has been found in ground water, all of the precautions in the Section 18 request should be followed. Although the toxicological properties of metalaxyl do not appear to indicate that metalaxyl is a risk factor, at present, metalaxyl and/or its degradates should be prevented from contaminating ground water.

9. BACKGROUND:

Metalaxyl is a systemic fungicide registered since 1979 for use on over 100 crops. Some principal uses are tobacco, ornamentals, turf, citrus, non-bearing nursery stock, seed treatment, vegetables and peanuts. Metalaxyl can be applied to either soil or foliage at rates ranging from 0.135 to 8.0 pounds a.i. per acre. Methods of application include foliar application, soil application (broadcast or band), drenching, sprinkler or drip irrigation, and soil mixing.

Metalaxyl is moderately stable to hydrolysis with half-lives from 115 to 200 days. The photolysis half-life in water is one week; in soil, the chemical is stable. Laboratory studies (supplemental data) indicate that metalaxyl is very mobile with Kds ranging from 0.43 (sand) to 1.40 (sandy clay loam), and a Koc of 16. Results of laboratory and field leaching studies indicate that both the parent and the primary degradate (CGA-62826) can leach in most soils (Metalaxyl Registration Standard, 1987). Tests indicate that metalaxyl is not oncogenic, mutagenic, or teratogenic, and that acute toxicity is low (memo: Barbehenn to Rossi, 7/17/87). The MCL and HAL for metalaxyl have not been established.

The 1981 Registration Standard for metalaxyl (Dec. 1981) required ground-water monitoring studies. In 1985, Ciba-Geigy submitted detections in ground water (EAB # 6330); metalaxyl detections were reported in Florida ground water at 3.1 and 4.7 ppb. In 1987 EPA recommended retrospective studies for metalaxyl (memo: Simko to Rossi, 8/19/87) because of its long history of use and the potential for metalaxyl and its major degradate to reach ground water.

Detections of metalaxyl were also reported in domestic potable well water supplies in North Carolina. Metalaxyl residues were detected from October 1986 through April 1988 at concentrations from 0.27 to 3.00 ppb. In April 1987 metalaxyl was detected in one domestic well in Tennessee at 0.77 ppb.

In October 1990, Ciba-Geigy reported results of ground-water monitoring by North Carolina Extension personnel at N.C. State University. Metalaxyl was detected at levels from 0.5 to 136 ppb but the registrant questioned the study results and analytical method. A second round of sampling in November, 1990 and March 1991 by the Extension Service, revealed residue levels of 66 ppb (Nov. 1990) and 815 ppb in March, 1991.

The GW Technology Section recommended (Barcode 158131 of 3/15/93) that the small-scale studies proposed for metalaxyl are "not needed at this time". However, GWTS recommended two regulatory actions:

1) a ground-water advisory, as follows:

"This chemical is known to leach through soil into ground water under certain conditions as a result of agricultural use. Use of the chemical in areas where soils are permeable, particularly where the water table is shallow, may result in ground-water contamination"

2) metalaxyl should be classified as a **Restricted Use** compound for ground-water concerns.

State of Wisconsin
Department of Agriculture, Trade & Consumer Protection

Alan T. Tracy
Secretary

801 West Badger Road
PO Box 8911
Madison, WI 53708-8911

Tibby

January 24, 1992

Ms. Rebecca Cool
U.S. Environmental Protection Agency
Office of Pesticide Programs (H7501C)
Emergency Response Section
401 M Street, SW
Washington, D.C. 20420

Dear Ms. Cool:

Enclosed is Wisconsin's application for an Emergency Exemption for use of Ridomil 5G on cultivated ginseng to control root rot caused by Phytophthora catorum during the 1992 growing season.

Your prompt attention to this request will be greatly appreciated by this agency and by Wisconsin's ginseng growers.

Please call me at 608-266-0197, if you or your staff have questions on this request.

Sincerely,

Edward A. Bergman
Pesticide Specialist
Agricultural Resource Management Division

Application for a Specific Exemption
for the Use of the Fungicide Ridomil 5G
on Cultivated Ginseng in 1992

This is an application under Section 18 of FIFRA for an exemption allowing use of the fungicide Ridomil 5G (metalaxyl) on cultivated American ginseng (Panax quinquefolius L.) (hereafter referred to as "ginseng") to control root rot caused by Phytophthora cactorum. Although Aliette was recently registered for use against Phytophthora on ginseng, Aliette is not very effective in controlling the root rot phase of the disease. Heavy crop losses are probable if no fungicide is applied. The manufacturer is pursuing a federal label for the compound for the 1992 growing season, and label registration is currently being evaluated by EPA. Extensive research shows that Ridomil 5G is effective in controlling Phytophthora root rot, and it is speculated that the compound also helps to control the foliar phase of the disease, since Ridomil moves upward systemically in the plant.

A. General information required in an application for a specific exemption

1. Identity of contact persons:
Technical questions regarding the use of Ridomil 5G should be addressed to:

Dr. Jennifer Parke
Department of Plant Pathology
University of Wisconsin-Madison
Madison, Wisconsin 53706
(608)262-0061

Questions regarding regulatory matters and the section 18 application should be addressed to:

Dr. Edward Bergman
Groundwater and Regulatory Services Section
Wisconsin Department of Agriculture, Trade,
and Consumer Protection
801 Badger Road
P.O. Box 8911
Madison, Wisconsin 53708
(608)266-0197

2. Description of the pesticide:

The fungicide Ridomil 5G, EPA Reg. No. 100-628, is registered by Ciba-Geigy Corp. Agricultural Division, Greensboro, North Carolina. It contains 5 percent metalaxyl (N-(2,6-dimethylphenyl)-N-(methoxyacetyl) alanine methyl ester) and 95% inert ingredients, in a granular formulation which is applied dry. Metalaxyl is a systemic fungicide which provides control of some crop diseases caused by fungi in the class Oomycetes. It is apparently active against the zoospore stage in the lifecycle of Phytophthora spp., and is known to be effective against Phytophthora root rot on other crops.

Metalaxyl does not have therapeutic activity against Phytophthora root rot of ginseng; rather, it prevents further infection and spread of the disease. Repeated applications are needed to replace the Ridomil taken up by the plant or lost to leaching.

3. Description of Proposed Use:

   i. The majority of the sites to be treated are located in Marathon County in north central Wisconsin, but substantial acreage of ginseng gardens is scattered throughout 52 other counties in the state. There are approximately 1762 ginseng growers in Wisconsin.

   ii. Ridomil 5G should be applied at a rate of 15 pounds material (0.75 lbs. active ingredient) pre-emergence, followed by three 10-pound treatments and a final 15-pound treatment at monthly intervals throughout the growing season. No more than 60 pounds of Ridomil 5G may be applied per acre per year.

   iii. Wisconsin has approximately 3,000 acres of ginseng under cultivation. It may be assumed that approximately 75% of this acreage, or 2250 acres, may be treated with Ridomil 5G in 1992.

   iv. The application of 60 pounds of Ridomil 5G to 2250 acres of ginseng would result in the use of 135,000 pounds of Ridomil 5G, or 6,750 pounds of the active ingredient metalaxyl.

   v. Restrictions:

      1. The person who owns the ginseng bed(s) on which this product is used, or who controls the use of this product on ginseng bed(s), is required to report each day's use of this product on ginseng to the Wisconsin Department of Agriculture, Trade and Consumer Protection, using forms provided by the Department. Additional report forms, if needed, will be provided to the applicators.

      2. All applications of this product to ginseng must be made by persons who are certified private applicators, or who are certified commercial applicators in the category Agricultural Field and Vegetable Crop Pest Control (category 1.1), or by persons working under the direct supervision of such certified applicators.

      3. A 7-day pre-harvest interval will be observed.

      4. EPA shall be informed immediately of any adverse effects resulting from the use of metalaxyl in connection with this exemption.

4. Alternative methods of control:

Phytophthora root rot is a soilborne disease that is most severe under wet soil conditions (see "Diseases of Cultivated Ginseng" enclosed). One of the most effective controls for root rot diseases, therefore, is to promote good soil drainage. Ginseng growers are encouraged to plant into well-drained soils in beds built up as high as possible. Even if such measures are carried out, however, an abundance of rainfall accompanied by cool weather will promote root rot development; these conditions occur frequently in Wisconsin. The fungus is widespread throughout forest and ginseng garden soils in Wisconsin.

Phytophthora may be spread in both soil and water; in order to contain the spread of the organism within and between gardens, it is suggested that growers rinse all mud from their equipment when working from garden to garden, and that they not use standing pond water to fill spray tanks.

The use of cultural practices described above is effective in delaying the introduction and reducing the spread of root rot, but cannot prevent extensive crop losses in many cases. Chemical controls are also needed to protect the crop. In 1989, Aliette (fosetyl-aluminum, Rhone-Poulenc, EPA No. 264-467) was labelled under a Section 3 registration through IR-4 for control of Phytophthora root rot and Phytophthora leaf blight. However, data from the UW Experimental Gardens show that Phytophthora root rot is best controlled by application of Ridomil 5G (Table 1). None of the unregistered chemicals are as effective as Ridomil 5G.

University of Wisconsin researchers are currently working to develop biological controls for Phytophthora cactorum for use in ginseng, and they are also testing various composts as soil amendments for suppressing Phytophthora root rot. Although these alternative methods offer some promise, they are not as effective as Ridomil 5G (Table 2). It is anticipated that should these biological and cultural controls prove successful after several years of field tests, they will be used along with reduced rates of Ridomil 5G in an integrated disease control program.

5. Effectiveness of proposed use:

Ridomil 5G treatments applied to a Phytophthora-infested ginseng garden in 1986, at the rates recommended above, significantly increased yields both of ginseng seed and root as compared with a non-treated control (Table 1). Ridomil 5G also gave significantly higher yields of seeds and roots than did Aliette 80W and Ridomil 2E. Ridomil 5G, a granular formulation which is applied dry, is also preferred because it does not require the use of additional water, something to be avoided when dealing with a disease promoted by high soil moisture.

Ridomil 5G is preferred because it needs to be applied only five times, as opposed to twelve applications required for Ridomil 2E or Aliette, thus reducing the number of times machinery must pass through the field and thereby decreasing the chances of spreading disease with machinery. Finally, data from the UW Experimental Gardens show that variations in Ridomil formulation, timing of application, and combinations of Ridomil 5G and Aliette do not significantly improve control beyond the level attained using the presently recommended formulation and application schedule for Ridomil (Table 3). However, all of the variations that were tested signficantly increased control compared to a non-treated check.

6. Discussion of Residues for Food:

Residue data on other root crops such as carrots and potatoes indicate that expected residues in ginseng would be negligible.

7. Discussion of Risk Information:

(i) There is no evidence that applications of metalaxyl according to exemption use recommendations and label guidance will pose unreasonable risks to human health, endangered species, wildlife or to the enivironment.

(ii) To date there have been no reports or observations of adverse impacts to wildlife, aquatic organisms or endangered species from use of metalaxyl in ginseng gardens.

(iii) Since gardens are located on upland sites, are small in size, intensely cultivated and covered by shade structures, the chance for exposure of wildlife species to Ridomil 5G applied to ginseng would be remote.

(iv) Metalaxyl has a short half-life (1-2 wks) and is rapidly metabolized and excreted by animals that have been tested in toxicological studies.

8. Coordination with Other Affected State or Federal Agencies:

The Wisconsin Department of Natural Resources Bureau of Endangered Resources and Dr. Scott Craven, University of Wisconsin Extension Wildlife Ecologist, have been advised of the proposed exemption.

9. Notification of the registrant:

Ciba-Geigy supports the application for a Specific Exemption for the requested use of Ridomil 5G on ginseng. The company has supplied this agency with information to complete the application and they are cooperating with studies to obtain information required for the federal registration, including residue studies.

10. State Enforcement Program

The department maintains a list of ginseng growers as a requirement of the U.S. Department of Interior program to prevent illegal export of wild ginseng. Using this mailing list the Department informs growers of pesticides authorized for use on ginseng and provides instructions on how to use them. The Department also works with the University of Wisconsin Agricultural Extension agents, the Wisconsin Ginseng Growers Association, the Ginseng Marketing Board, and the media to disseminate information on pesticide use. The Department's field staff monitors pesticide dealers' records, makes random pesticide use observations and responds to pesticide misuse complaints.

B. Information Required for Specific Exemption:

1. The scientific and common name of the pests:

The plant pathogenic fungus causing Phytophthora root rot is Phytophthora cactorum.

2. Discussion of the Emergency Condition:

Phytophthora cactorum is an aggressive pathogen which can spread rapidly through a ginseng garden; infecting roots and sometimes foliage as well. A severe root or foliar infection will kill the plant outright; foliar infection also provides fungal propagules which can be spread by machinery or wind-blown rain to infect neighboring gardens. A non-lethal root infection causes the harvested root to become discolored as it dries, rendering it unmarketable. Phytophthora root rot can destroy a ginseng garden at any stage of growth, and has been known to infest and destroy a formerly healthy garden within three weeks of harvest. Because of the threat of Phytophthora infections, growers are often forced to harvest roots, formally dug in the fourth year, often as soon as the third or even second year. Immature roots are much less valuable, and early digging represents a substantial economic loss to growers.

Ginseng is grown on approximately 3000 acres in Wisconsin. Each year, approximately one third of this acreage is harvested. Due to the severe outbreak of Phytophthora root rot and foliar blight in 1986, a year of abundant rainfall, several hundred acres of mature and immature roots rotted before they could be harvested. With a crop value of approximately $68,000 per acre and yield losses of up to 100%, this represents an extreme financial hardship to growers. In addition, an inspection of the roots which were harvested in Marathon County in 1986 showed that approximately 40% were ruined by non-lethal Phytophthora infection. The potential loss due to postharvest culling of infected roots is estimated to be $27,200 per acre.

Aliette is the only fungicide registered for use against Phytophthora on ginseng; however this fungicide is not very effective against root rot. Dithane M45, which was granted a Section 18 in 1987-1990 for Alternaria blight control, probably controls the foliar phase of the disease, but has no effect upon root rot, and may not be used in the harvest year. It is speculated that Ridomil 5G, because of its upward mobility in the plant, may have some inhibitory effect upon the foliar phase of the Phytophthora disease complex, although there is no data to support this hypothesis.

Growers are encouraged to practice sanitation and cultural measures known to limit the severity and spread of the Phytophthora diseases. However, root rot cannot be adequately controlled without Ridomil 5G.

3. Risks to Endangered Species, Beneficial Organisms or the Environment:

There is no evidence that this use of Ridomil 5G on ginseng would pose a risk to endangered or threatened species, beneficial organisms, or to the environment.

The department has advised the Wisconsin Department of Natural Resources Bureau of Endangered Species of the intent to apply for a Specific Exemption for use of Ridomil on cultivated ginseng for the 1992 growing season.

Ginseng is grown on upland sites, primarily on fallow fields or pasture land. Individual gardens are normally small in size (1 acre or less), intensely worked, usually fenced and covered by shade-producing structures. Because of these factors, few if any wildlife species, especially endangered species, are likely to be exposed to applications of Ridomil 5G on ginseng. Also, with the gardens located on upland sites and covered by shade structures, contamination of surface waters from pesticide-contaminated runoff is unlikely.

No impacts on wildlife or aquatic organisms have been reported or observed from applications of Ridomil 5G on ginseng in the years in which a Specific Exemption for Ridomil was granted to the department.

EPA has previously noted specific concerns about the possible acute toxicity of other pesticides to bald eagles, peregrine falcons and the Kirkland's warbler. The resident bald eagle populations in Wisconsin are largely restricted to the inland lake areas of the northern third of the state. Acute exposure of bald eagles to Ridomil applied to ginseng is remote due to the cultural practices associated with growing ginseng and the lack of prey and other factors that would serve to attract eagles to the gardens during the ginseng growing season.

The peregrine falcon was extirpated from Wisconsin 1964. However, in 1982 a reintroduction program was started in Minnesota, and in 1986, four of the Minnesota released birds nested on the Wisconsin side of the Mississippi river. Since then, 50 birds have been released in Wisconsin. In 1990, seven pairs returned to nest in Minnesota, and one pair returned to a release site in Milwaukee, Wisconsin. Exposure of this small resident population of peregrine falcons in Wisconsin to Ridomil applied to ginseng would be unlikely. The chance for exposure of migrating peregrine falcons and bald eagles to Ridomil is also believed to be remote since most of the Ridomil applications on ginseng have been completed prior to the migration season and because there do not appear to be any factors associated with the gardens that would serve to attract these birds.

Kirkland's warbler, according to the WDNR Bureau of Endangered Species, is extinct in Wisconsin and even if it was found in the state, its preferred habitat (jack pine forest) is not the type of habitat where ginseng is grown.

In Wisconsin, chlorinated hydrocarbons still remain the primary pesticides of concern with respect to toxicological impacts on birds of prey, especially for the bald eagle.

4. Discussion of Anticipated Economic Loss:

Phytophthora can completely destroy affected gardens. When it develops in a garden, a grower's best option is to dig what roots are present no matter what their age or stage of development. As mentioned above, the grower then loses not only the root which dies before harvest, but also the income he expected to gain had he been able to harvest roots at maturity. The experience in 1986 suggests that in growing seasons with abundant rainfall, 50-60% losses of the total ginseng crop could occur.

i) Historical net and gross revenues:

The price obtained by a grower has varied from more than $70 per pound to less than $20 per pound; the present day price is approximately $40 per pound or $68,000 per acre (assuming an average yield of 1700 pounds per acre). The $68,000 gross return must be adjusted by the $35,000 per acre investment which the grower may expect to incur during the three years it takes to bring the crop to harvest. The resulting estimate of $33,000 for a return thus represents income resulting from three years' use of a piece of land.

ii) Estimated revenue without the use of the pesticide:

In the absence of disease, a grower can expect a per-acre yield from three-year-old ginseng of about 1700 pounds. Phytophthora root rot can easily destroy the entire garden, but if the grower harvests even 50% of the roots he expected, he has lost 850 pounds. worth an average of $40 per pound, or $34,000 per acre. The grower in this situation would have a net loss of $1,000 after considering his $35,000 investment in growing the ginseng.

The price of ginseng is based on the weight and quality of the roots. It is anticipated that without using a Ridomil 5G to control root rot, quality in harvested roots would be poor and roots would be small, bringing an average of $30 or less per pound, compared with a price of at least $40 per pound for mature, healthy roots.

iii) Estimated yield with use of the pesticide:

A yield of at least 1700 pounds per acre could be expected if root rot were controlled with Ridomil 5G, and that yield could be improved with recommended cultural practices.

iv) Estimated net and gross revenues:

Using Ridomil 5G to control root rot, and assuming Alternaria is controlled, a grower can expect to sell roots for about $40 per pound, to give a gross revenue of $68,000 per acre. Net return after subtracting costs of growing the crop would be $33,000 per acre for a three-year crop.

Table 1. Effect of fungicides on yields of seeds and roots in a ginseng garden affected by Phytophthora root rot, Marathon County Garden B, 1986.

Fungicide	Rate per acre per application	Seed yield (grams per 90 sq.ft.)	Root dry wt. (grams per 90 sq. ft.)
None	---	64.0 c[1]	80.2 b[1]
Aliette[2]	5 lb.	164.0 b	132.9 b
Ridomil 2E[3]	0.5 gal	181.4 b	345.2 a
Ridomil 5G[3]	20 lb.	284.2 a	421.5 a

[1]Values are means of four replications. Values in each column followed by the same letter do not differ significantly according to Duncan's New Multiple Range Test at P = 0.05.

[2]Aliette was applied 13 times at weekly intervals.

[3]Ridomil was applied three times at monthly intervals.

Table 2. Comparison of Ridomil 5G with composts applied as mulches and biological controls for effectiveness against Phythophthora root rot. Experimental plots in Garden E3B were inoculated with Phytophthora cactorum in 1988 and harvested in 1989.

Treatment	Dry root yield (lbs/acre)
Ridomil 5G (60 lb/acre)	1320 a[z]
Fish-hardwood compost	721 b
Pay-Gro compost	720 b
None	378 c
Quantum 4000 (Bacillus subtilis)	276 c
UW85 (Bacillus cereus)	126 c
Uninoculated broth check	111 c

z Values are means of 9 replicates. Values not followed by the same letter are significantly different (LSD, P=0.05).

Table 3. Comparison of various Ridomil formulations, application timing, and the combination of Ridomil and Aliette for effectiveness against Phytophthora root rot. Experimental plots in Garden E2 were inoculated with Phytophthora cactorum in 1988 and harvested in 1990.

Treatment	Dry root yield (lbs/acre)
Check	913 a[1]
Ridomil 5G 15-10-10-10-15	1421 b
Ridomil MEG 30[2]	1469 b
Ridomil MEG 60[3]	1477 b
Ridomil 5G 20-10-10-10-10	1556 b
Ridomil 5G/Aliette monthly[4]	1621 b
Ridomil MEG 15-10-10-10-15	1630 b
Ridomil 5G/Aliette biweekly[5]	1961 b

[1]Values are means of 9 replicates. Values not followed by the same letter are significantly different (LSD,P=0.05.

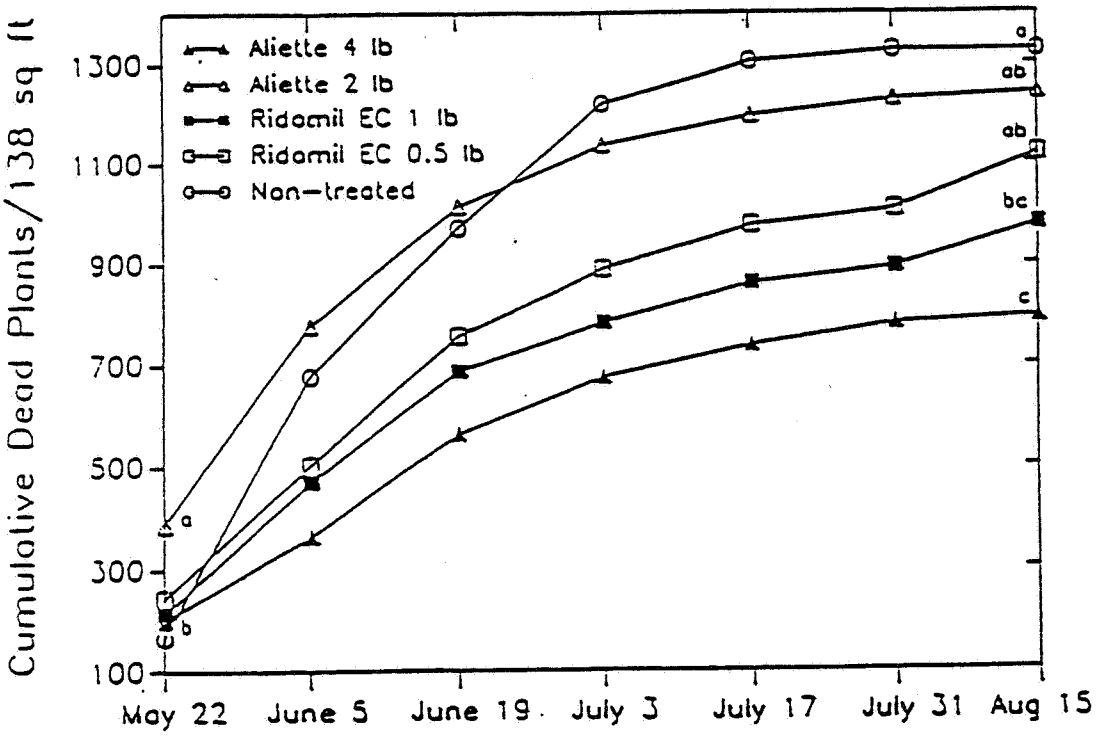
[2]Ridomil MEG applied twice/season at 30 lbs/acre; end of April and 1st of July.

[3]Ridomil MEG applied once/season at 60 lbs/acre; end of April.

[4]Ridomil 5G applied monthly at 15-10-10-10-15 lbs/acre, and Aliette applied at 5 lbs/acre every 30 days.

[5]Ridomil 5G applied monthly at 15-10-10-10-15 lbs/acre, and Aliette applied at 5 lbs/acre every 14 days after emergence.

Figure 1. Effect of systemic fungicides on reducing plant mortality caused by Phytophthora leaf blight in a three-year-old ginseng garden in Richland County, 1986. Fungicides were applied weekly from May through August 7 for a total of 15 applications. Values with the same letter at each date do not differ significantly according to Duncan's new multiple range test at P=0.05.



Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
METALAXYL
Last Update on May 7, 1993
[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

LOGOUT	Reviewer:	Section Head: JW	Date: 6/25/93

Common Name:METALAXYL
Smiles Code:c(cc(C)c1N(C(=O)COC)C(C(=O)OC)C)cc1C
PC Code # :113501 CAS #:57837-19-1 Caswell #:

Chem. Name :N-(2,6-DIMETHYLPHENYL)-N-(METHOXYACETYL)-ALANINE
METHYL ESTER
Action Type:FUNGICIDE

Trade Names:APRON 25WP; CGA 48988; RIDOMIL
(Formul'tn):EC 2 LBS/GAL; FLOWABLE CONC.
Physical State:

Use :CONTROL OF SOIL-BORNE DISEASES CAUSED BY PYTHIUM AND PHYTO-
Patterns :PHORA, AND FOLIAR DISEASES CAUSED BY DOWNY MILDEW.
(% Usage) :
:

Empirical Form: $C_{15}H_{21}NO_4$
Molecular Wgt.: 279.34 Vapor Pressure: 2.20E -6 Torr
Melting Point : 71.8-72.C °C Boiling Point: °C
Log Kow : pKa: @ °C
Henry's : E Atm. M3/Mol (Measured) 1.14E-10 (calc'd)

Solubility in ...				Comments
Water	7.10E 3	ppm	@20.0 °C	
Acetone	E	ppm	@ °C	
Acetonitrile	E	ppm	@ °C	
Benzene	55.00E	ppm	@ °C	
Chloroform	E	ppm	@ °C	?
Ethanol	E	ppm	@ °C	
Methanol	E	ppm	@ °C	
Toluene	E	ppm	@ °C	
Xylene	E	ppm	@ °C	
	E	ppm	@ °C	
	E	ppm	@ °C	

Hydrolysis (161-1)
[V] pH 5.0:200 DA
[V] pH 7.0:200 DA
[V] pH 9.0:115 DA
[ ] pH :
[ ] pH :
[ ] pH :

Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
METALAXYL
Last Update on May 7, 1993
[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

Photolysis (161-2, -3, -4)
[V] Water: 1 WK
[ ] :
[ ] :
[ ] :

[V] Soil : STABLE
[ ] Air :

Aerobic Soil Metabolism (162-1)
[S] 7 WK (SOIL?)
[V] 40 DAYS
[ ]
[ ]
[ ]
[ ]
[ ]

Anaerobic Soil Metabolism (162-2)
[V] 60 DAYS
[ ]
[ ]
[ ]
[ ]
[ ]
[ ]

Anaerobic Aquatic Metabolism (162-3)
[V] 21.7 AND 26.9 DAYS IN SEDIMENT AND WATER PHASES, RESPECTIVELY.
[ ]
[ ]
[ ]
[ ]
[ ]
[ ]

Aerobic Aquatic Metabolism (162-4)
[S] 55.11 DAYS IN SOIL + WATER. 70 DAYS IN SOIL AND 41 DAYS IN H2O.
[ ]
[ ]
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Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
METALAXYL
Last Update on May 7, 1993
[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

Soil Partition Coefficient (Kd) (163-1)
[S] 0.43-0.48 SAND
[S] 0.87 SILT LOAM
[S] 1.40 SANDY CLAY LOAM
[ ]
[ ]
[ ]

Soil Rf Factors (163-1)
[S] 70% IN LEACHATE
[ ]
[ ]
[ ]
[ ]
[ ]

Laboratory Volatility (163-2)
[S] LOSS DUE TO VOLATILIZATION SHOULD BE <0.5%.
[ ]

Field Volatility (163-3)
[ ]
[ ]

Terrestrial Field Dissipation (164-1)
[S] 2 WK (SOIL?). MAJOR DEGRADATE PEAKED DURING THE FIRST
[ ] MONTH AT 20%, DECLINED TO 0.5% OF THE APPLIED AT A YEAR.
[ ] HOWEVER, IN ANOTHER STUDY THE AMT. REMAINING IN A YEAR WAS
[ ] 23% OF THAT APPLIED.
[ ]
[ ] 3 STUDIES PRODUCED HALF-LIVES OF 38, 50 AND 56 DAYS. PARENT AND
[ ] CGA LEACHED TO 36-48" SOIL DEPTH
[ ]
[ ]
[ ]

Aquatic Dissipation (164-2)
[S] 20 DAYS FROM PADDY WATER AND 24 DAYS FROM SOIL.
[S] 5 DAYS FROM PADDY WATER AND 11 DAYS FROM SOIL.
[ ]
[ ]
[ ]
[ ]

Forestry Dissipation (164-3)
[ ]
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Long-Term Soil Dissipation (164-5)
[ ]
[ ]

Accumulation in Rotational Crops, Confined (165-1)
[S] LETTUCE-.11 PPM; OATS (WHOLE PLANT) .33;
[ ] CORN .06 PPM; SOYBEANS 0.8 PPM; SUGARBEETS .16 PPM.

Accumulation in Rotational Crops, Field (165-2)
[S] PLANTED IN ROTATION TO POTATOES: CORN .02 PPM;
[ ] SUGARBEETS <.05 IN ROOTS; SOYBEANS .83 PPM

Accumulation in Irrigated Crops (165-3)
[ ]
[ ]

Bioaccumulation in Fish (165-4)
[ ] BLUEGILL 1X EDIB; 14X VISC; 6X WHOLE; RAPID DEPURATION.
[ ] CATFISH 1X EDIB; 1X VISC; 1X WHOLE; RAPID DEPURATION.

Bioaccumulation in Non-Target Organisms (165-5)
[S] NO ADVERSE EFFECTS EXPECTED ON AVIAN, MAMMALIAN,
[ ] OR FRESHWATER AQUATIC SPECIES.

Ground Water Monitoring, Prospective (166-1)
[ ]
[ ]
[ ]
[ ]

Ground Water Monitoring, Small Scale Retrospective (166-2)
[ ] Requirement for ground-water monitoring studies has been
[ ] waived pending regulatory action.
[ ]
[ ]

Ground Water Monitoring, Large Scale Retrospective (166-3)
[ ]
[ ]
[ ]
[ ]

Ground Water Monitoring, Miscellaneous Data (158.75)
[S] METALAXYL HAS BEEN REPORTED IN GROUND WATER IN FLORIDA,
[ ] NORTH CAROLINA, AND TENNESSEE. Concentrations range from 0.27-
[ ] 236 ppb.

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Field Runoff (167-1)
[ ]
[ ]
[ ]
[ ]

Surface Water Monitoring (167-2)
[ ]
[ ]
[ ]
[ ]

Spray Drift, Droplet Spectrum (201-1)
[ ]
[ ]
[ ]
[ ]

Spray Drift, Field Evaluation (202-1)
[ ]
[ ]
[ ]
[ ]

Degradation Products

(N-(2,6-dimethylphenyl)-N-(2'-methoxyacetyl) alanine is the major degradate.

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Comments

Parent compound leached rapidly in sand soils with up to 92% of radioactivity recovered in leachate. In SdClLm soils, majority of radioact. was in 6-12 cm soil with less than 0.4% in leachate. Soil Koc = 16. Up to 31% of CGA-62826 was detected in leachates.

References: EFGWB REVIEWS
Writer : SJS, PJH, SLL, EW, RJM