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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

AUG 17 1994

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: RH7592 Registration Standard

FROM: *for* Anthony F. Maciorowski, PhD, Chief
Ecological Effects Branch
Environmental Fate and Effects Division

Douglas J. Lyden
8/17/94

TO: Cynthia Giles-Parker, PM 22
Registration Division

Attached is an amended ecological risk assessment portion for the registration standard for fenbuconazole. This amendment considers in addition to stone fruits and pecans which were originally reviewed, but also the proposed uses on almonds and ornamentals.



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To: Cynthia Giles-Parker
 Product Manager 22
 Registration Division (H7505C)

From: Anthony F. Maciorowski, Chief
 Ecological Effects Branch/EFED (H7507C)

Attached, please find the EEB review of...

Reg./File # : 000707-EGR
 Chemical Name : Fenbuconazole
 Type Product : Fungicide
 Product Name : Fenethanil, Indar 2F
 Company Name : Rohm and Haas Company
 Purpose : Review proposed registration for use on
 almonds.

Action Code : 100 *R. H. Resch* Date Due : 07/09/93
 Reviewer : ~~H. Mansfield~~ Date In : 03/11/93

EEB Guideline/MRID Summary Table: The review in this package contains an evaluation of the following:

GDLN NO	MRID NO	CAT	GDLN NO	MRID NO	CAT	GDLN NO	MRID NO	CAT
71-1(A)			72-2(A)			72-7(A)		
71-1(B)			72-2(B)			72-7(B)		
71-2(A)			72-3(A)			122-1(A)		
71-2(B)			72-3(B)			122-1(B)		
71-3			72-3(C)			122-2		
71-4(A)			72-3(D)			123-1(A)		
71-4(B)			72-3(E)			123-1(B)		
71-5(A)			72-3(F)			123-2		
71-5(B)			72-4(A)			124-1		
72-1(A)			72-4(B)			124-2		
72-1(B)			72-5			141-1		
72-1(C)			72-6			141-2		
72-1(D)						141-5		

Y=Acceptable (Study satisfied Guideline)/Concur
 P=Partial (Study partially fulfilled Guideline but additional information is needed)
 S=Supplemental (Study provided useful information but Guideline was not satisfied)
 N=Unacceptable (Study was rejected)/Nonconcur

2

RH7592 (FENBUCONAZOLE)

Ecological Effects
Topical Summaries

Effects on Birds

Five studies were received and reviewed under this topic. All five studies were acceptable for use in a risk assessment.

Author	Date	MRID No.
Fletcher, D.W.	1988	410312-31
Fletcher, D.W.	1988	410312-32
Fletcher, D.W.	1988	410312-33
Beavers, J.B., et al.	1991	418750-05
Beavers, J.B., et al.	1991	418750-06

To establish the toxicity of RH7592 to birds, the following tests are required using the technical grade material (TGAI):

- A. One avian single-dose oral study on either a waterfowl species (preferably mallard duck) or an upland game species (preferably bobwhite quail).
- B. Two subacute dietary studies: one study on a species of upland game bird (preferably bobwhite quail) and one study on a species of waterfowl (preferably mallard duck).

Avian acute oral toxicity:

Data Requirements	Test	Bibliographic	Validation	Results
71-1 Avian Oral-Bobwhite Quail	.96.7% a.i.	410312-31	Core	LD ₅₀ >2150 mg/kg

These data indicate that RH7592 is practically non-toxic to upland game species on an acute oral basis. The guideline requirement for an avian acute oral study is fulfilled.

Avian subacute dietary:

Data Requirements	Test	Bibliographic	Validation	Results
71-2 Avian Dietary-Bobwhite	96.7% a.i.	410312-33	Core	LC ₅₀ =4050 ppm
-Mallard	96.7% a.i.	410312-32	Core	LC ₅₀ =2013 ppm

These data indicate that RH7592 is slightly toxic to birds on a dietary basis. The guideline requirement is fulfilled by these studies.

Avian reproduction:

Avian reproduction tests are required for a pesticide when: birds may be subjected to repeated or continuous exposure, the pesticide is stable in the environment, the pesticide is stored or accumulated in plant or animal tissues, or reproduction in terrestrial vertebrates may be adversely affected based on information from mammalian reproduction studies.

Avian reproduction studies are required to support registration of RH7592 because, environmental fate data indicate that RH7592 is quite stable and may be persistent in the environment (under aerobic conditions up to 367 days and under anaerobic conditions up to 655 days).

The acceptable avian reproduction studies for use in a risk assessment are listed below:

Data Requirements	Test	Bibliographic	Validation	Results
71-4 Avian Reproduction-Bobwhite	96.7% a.i.	418750-05	Core	NOEC= 150 ppm
-Mallard	96.7% a.i.	418750-06	Core	NOEC= 150 ppm

The results for mallard duck reproduction indicate significant reductions in female body weight gain and in food consumption at the 600 ppm concentration. In addition at 600 ppm, although not significant, there were decreases in male body weights, reduced egg production, and reduced egg hatchability.

The results for bobwhite quail reproduction using nominal dietary concentrations of RH7592 at 30, 150, and 600 ppm found a slight decrease in egg-shell thickness at the 600 ppm level, which was attributed to treatment exposure. No additional effects were found in any treatment level for mortality, behavior, or food consumption.

Precautionary Labeling

The available toxicity data indicates that precautionary labeling for birds on RH7592 products may be required.

Effects on Freshwater Fish

Four studies were received and reviewed under this topic. Three of the four studies were acceptable for use in a risk assessment.

Author	Date	MRID No.
Swigert, J.P.	1988	410312-35
Swigert, J.P.	1988	410735-06
Sword, M.C. & J.L. Stratton	1991	420410-01
Rhodes, J.E., et al.	1991	418750-08

To establish the toxicity of RH7592 to freshwater fish, the following test is required using technical grade active ingredient (TGAI):

A. Two 96-hour studies with both coldwater and warmwater species of fish. The preferred coldwater species is rainbow trout and the preferred warmwater species is bluegill sunfish.

Freshwater Fish Acute Toxicity

Data Requirements	Test	Bibliographic	Validation	Results
72-1 Freshwater Fish -Trout -Bluegill	96.7% a.i. 96.7% a.i.	410312-35 410735-06	Core Core	LC ₅₀ = 1.50 ppm LC ₅₀ = 0.68 ppm

These results indicate that RH7592 is moderately toxic to coldwater species and highly toxic to warmwater species of fish. The guideline requirements are fulfilled for acute toxicity testing on freshwater fish.

Fish Early Life Stage Test

Data from fish early life stage tests are required to support the registration of an end-use product that is expected to be

transported to water from the intended use site when certain conditions, including any of the following apply:

* Any EC_{50}/LC_{50} value in acute tests is less than 1 mg/L. The bluegill sunfish value was 0.68 mg/L.

* The EEC in water is equal to or greater than 0.01 of any EC_{50} or LC_{50} from acute testing. When applied at maximum rate (0.125 lbs. a.i./A), expected concentrations for direct application to a 6 inch layer of water immediately after application are up to 0.092 ppm.

* The EEC is less than 0.01 of EC_{50}/LC_{50} values and the pesticide is persistent in water. RH7592 was stable to hydrolysis at pH 5, 7, and 9.

Data from fish early life stage studies are required to support registration of RH7592.

Data Requirements	Test	Bibliographic	Validation	Results
72-4 Freshwater Fish Early Life Stage-				
Fathead Minnow	96.7% a.i.	420410-01	Core	MATC >0.082 & <0.16 ppm
Fathead Minnow	96.7% a.i.	418750-08	Supplemental	LOEC=0.28 ppm

The studies under this topic may be used in a risk assessment.

Freshwater Fish Life-Cycle

No studies were evaluated under this topic.

Data from fish life-cycle tests are required to support the registration of an end-use product that is expected to be transported to water from the intended use site when any of the following conditions apply:

* If the estimated EEC is $> 1/10$ of the no effect level in the fish early life stage or invertebrate life cycle test.

* If studies of other organisms indicate that the reproductive physiology of the fish may be affected.

Data from a fish life-cycle test are required, as results from the fish early life stage indicate an EEC $> 1/10$ the NOEC and related information suggest that reproductive physiology of fish may be affected.

Precautionary Labeling

Based on the above results, a precautionary statement for fish is required for technical RH7592.

This pesticide is highly toxic to fish. Do not apply directly to water, or to areas below the mean high water mark. Drift and runoff from treated areas may be hazardous to aquatic organisms in adjacent aquatic sites. Do not contaminate water when disposing of equipment washwaters and rinsates.

Effects on Freshwater Invertebrates

Two studies were evaluated under this topic. Both are acceptable to use in a risk assessment.

<u>Author</u>	<u>Date</u>	<u>MRID No.</u>
Burgess, D.	1988	410735-07
Blakemore, G.C. & D. Burgess	1991	418750-07

To establish the toxicity of RH7592 to aquatic invertebrates, the following test is required using technical grade active ingredients (TGAI).

A. 48-hour acute study using TGAI. Test organisms should be first instar Daphnia magna.

The acceptable study for acute toxicity of TGAI RH7592 to freshwater invertebrates is listed below:

<u>Data Requirements</u>	<u>Test</u>	<u>Bibliographic</u>	<u>Validation</u>	<u>Results</u>
72-2 Freshwater Invertebrate <u>-Daphnia magna</u>	96.7% a.i.	410735-07	Core	EC ₅₀ = 2.3 ppm

These results indicate that RH7592 is moderately toxic to freshwater invertebrates.

Aquatic Invertebrate Life Cycle Test

Data from an aquatic invertebrate life cycle test are required to support the registration of an end-use product that is expected to be transported to water from the intended use site when certain conditions, including the following, apply:

* Any EC₅₀/LC₅₀ value in acute tests is less than 1 mg/L. The bluegill sunfish value was 0.68 mg/L.

* The EEC in water is equal to or greater than 0.01 of any EC₅₀ or LC₅₀ from acute testing. When applied at maximum rate (0.125 lbs. a.i./A), expected concentrations for direct application to a 6 inch layer of water immediately after application are up to 0.092 ppm.

* The EEC is less than 0.01 of EC₅₀/LC₅₀ values and the pesticide is persistent in water. RH7592 was stable to hydrolysis at pH 5, 7, and 9.

Data from an invertebrate life cycle are required to support registration of RH7592.

Although the study under this topic is classified as supplemental it may be used in a risk assessment:

Data Requirements	Test	Bibliographic	Validation	Results
72-4 Freshwater Invertebrate Life Cycle- <u>Daphnia magna</u>	96.7% a.i.	418750-07	Supplemental	MATC >0.078 & <0.15 ppm geometric MATC=0.11 ppm

The guideline requirements are fulfilled for toxicity testing on freshwater invertebrates.

Precautionary Labeling

Based on the above results, a precautionary statement for aquatic invertebrates may be required for technical RH7592.

Effects on Estuarine and Marine Organisms

Three studies were evaluated under this topic.

<u>Author</u>	<u>Date</u>	<u>MRID No.</u>
Machado	1993	430580-01 430580-02
Dionne	1993	430580-03

Data describing the acute toxicity of the pesticide to estuarine and marine organisms are required to support the registration of an end-use product intended for direct application to the estuarine or marine environment or if it is expected to enter this environment in significant concentrations because of its expected use or mobility pattern.

The proposed use pattern for RH7592 includes stone fruits and pecans, which are grown in coastal counties. Therefore, the following studies are required to establish the toxicity of RH7592 to Estuarine and Marine Organisms:

- A. 96-hour LC₅₀ study on an estuarine/marine species of shrimp using TGAI of RH7592.
- B. 96-hour LC₅₀ study on an estuarine/marine species of fish using TGAI of RH7592.
- C. 48-hour EC₅₀ study with oyster embryolarvae or a 96-hour EC₅₀ oyster shell deposition study using the TGAI of RH7592.

Data Requirements	Test	Bibliographic	Validation	Results
72-3 Estuarine Fish Acute Toxicity -Sheepshead Minnow	98% a.i.	430580-01	Core	LC ₅₀ = 1.8 mg/L
72-3 Estuarine Shrimp Acute Toxicity Mysid shrimp	98% a.i.	430580-02	Core	EC ₅₀ = 0.63 mg/L
72-3 Estuarine Oyster Acute Toxicity Eastern Oyster	98% a.i.	430580-03	Core	EC ₅₀ = 1.2 mg/L

These data can be used in the risk assessment and characterize the toxicity of estuarine and marine organisms as moderately toxic to fish and oysters and highly toxic to crustaceans.

Effects on Non-Target Insects

One acute honey bee study was submitted and evaluated under this topic. The study is listed below:

<u>Author</u>	<u>Date</u>	<u>MRID No.</u>
Atkins, E.L.	1988	410312-38

The minimum data requirement for establishing toxicity to honey bees Apis mellifera are:

- A. Honey bee acute toxicity study using the technical grade active ingredient (TGAI).

9

below:

Data Requirements	Test	Bibliographic	Validation	Results
141-1 Non-Target Insects -Honey bee	96.7% a.i.	410312-38	Core	LD ₅₀ >292.18 ug/bee

These results indicate that RH7592 is relatively non-toxic to honey bees, when administered as a dusting powder. The guideline requirements are fulfilled for acute toxicity testing on non-target insects.

Precautionary Labeling

The available acute toxicity data indicate that precautionary labels for honey bees are not required.

Effects on Non-Target Plants

Two studies were evaluated under this topic. The following studies were considered supplemental, however information derived from the study may be used in a risk assessment:

<u>Author</u>	<u>Date</u>	<u>MRID No.</u>
Burgess, D. & J.W. Blasberg	1991	418750-09
Douglas, M. & R. Halls	1990	429147-02

The minimum data requirements for determining toxicity to non-target plants are listed below:

- A. Aquatic Plant Growth study using Technical Grade Active Ingredient (TGAI).
- B. Seed Germination/Seedling Emergence using TGAI.
- C. Vegetative Vigor using TGAI.

The submitted studies are listed below:

Data Requirements	Test	Bibliographic	Validation	Results
123-2 Growth & Reproduction of Aquatic Plants-Tier 2				
<u>Selenastrum capricornutum</u>	96.7% a.i.	418750-09	Supplemental	EC50=0.41 ppm
<u>Scenedesmus subspicatus</u>	96.7% a.i.	429147-02	Supplemental	EC50=0.25 ppm

The data requirements for Non-Target Plants can be fulfilled with the submission of a core Tier 2 data. Additional studies may be required pending the results of the above required study.

Precautionary Labeling

Based on the above supplemental study precautionary labeling may be required for aquatic plants.

Ecological Effects Disciplinary Review

I. Ecological Effects Profile

A. Terrestrial Studies

An LD50 greater than 2150 mg/kg was determined for bobwhite quail given a single oral dose of RH7592 (MRID 410312-31). Therefore, RH7592 can be considered practically-non-toxic to bobwhite quail on an acute basis.

Results from the 8-day subacute dietary LC50 for mallard ducks and bobwhite quail were determined to be 2013 mg/kg and 4050 mg/kg, respectively (MRID 410312-32, 410312-33). These results indicate that RH7592 is slightly toxic to mallard ducks and bobwhite quail on a dietary basis.

Avian Reproduction Studies indicate that no reproductive impairment was shown to occur in mallard ducks at a dietary dose of 150 ppm technical RH7592 (MRID 418750-06). No reproductive impairment was shown to occur in bobwhite quail at a dietary dose of 150 ppm (MRID 418750-05).

An acute oral LD50 performed on rats (MRID 410312-07) indicated that RH7592 is practically nontoxic to mammals (LD50>2000 mg/kg). A three month feeding study (MRID 410735-02) produced a NOEL of 20 ppm. In addition, a two-generation reproduction study (MRID 410312-15) on rats indicated the NOEL of 80 ppm.

B. Aquatic Studies

Two studies were submitted on the acute toxicity of freshwater fish. The LC50 value for rainbow trout was 1.5 mg/L, indicating that the TGAI (technical grade active ingredient) of RH7592 is moderately toxic to coldwater fish species (MRID 410312-35). In addition, the LC50 value for bluegill sunfish was 0.68 mg/L, indicating the TGAI of RH7592 is highly toxic to warmwater fish species (MRID 410735-06).

Results from fish early life stage studies using rainbow trout suggest that the MATC of TGAI RH7592 to this species was greater than 0.082 mg/L and less than 0.16 mg/L (MRID 420410-01).

The 48-hour EC50 for Daphnia magna freshwater invertebrates was 2.3 mg/L (MRID 410735-07).

The results from the freshwater invertebrate life cycle study using TGAI of RH7592 suggests the MATC to be greater than 0.078 and less than 0.15 mg/L (MRID 418750-07).

RH7592 is characterized as moderately to highly toxic to estuarine and marine organisms. The LC50 for the sheepshead minnow is 1.8 mg/L and for the mysid 0.63 mg/L. The EC50 for the Eastern oyster is 1.2 mg/L.

C. Effects on Non-Target Insects

These results indicate that RH7592 is relatively non-toxic to honey bees, when administered as a dusting powder. The LD50 was greater than 292.2 ug/bee, indicating that RH7592 is practically non-toxic to honey bees.

D. Effects on Non-Target Plants

A study performed on Selenastrum capricornutum for a Tier 2 aquatic plant growth and reproduction study determined the 120-hour LOEC and EC50 to be 0.09 and 0.41 mg/l, respectively. However, the study was unable to determine an NOEC and therefore, deemed supplemental. Another study with Scenedesmus subspicatus, also deemed supplemental, approximated a 96-hr EC50 of 0.25 mg/L.

II. Ecological Hazard Assessment

Submission Purpose and Pesticide Use

Rohm and Haas is requesting a Section 3 Registration for RH7592. RH7592 is a protectant or presymptomatic infection treatment used for control of a variety of fungal diseases. The proposed

registration requested is for use on stone fruits (apricots, cherries, nectarines, peaches, plums, and prunes), dried prunes, pecans, almonds, and ornamentals. Applications are recommended to begin early to mid summer and continue throughout the growing season. It is formulated as a flowable concentrate which contains 2 lb a.i./gallon. According to the proposed labels (see attachment) the maximum allowable rate for a single application is 0.125 lb a.i./A (stone fruits and pecans) or 0.1 lb.a.i./A (almonds and ornamentals), with multiple applications (10 day interval) up to 1 lb a.i./A. RH7592 is to be applied by ground equipment, however specific application methods were not specified. EEB along with EFGWB are assuming that ground application includes conventional orchard (airblast or mist blower) methods. In addition, EEB notes that for an EUP on stone fruits (DP Barcode 169204) and an EUP and Section 3 Registration on apples (DP Barcodes 182264 and 182867) for RH7592 indicates both ground and **aerial** applications would be utilized.

Environmental Persistence

RH7592 is moderately persistent with surface degradation half-life ranging from 79 days for soil photolysis to 367 days for aerobic soil metabolism. Degradation of RH7592 at depth will also occur slowly as the compound was stable to hydrolysis at pH 5, 7, and 9 and degraded in soil under anaerobic conditions with half-lives of 451-655 days. RH7592 and its degradates appear to be slightly mobile to immobile in soil with K_d 's ranging from 5 to 115. The principle route of dissipation appears to be adsorption to soil, with increased adsorption associated with higher organic matter content. According to EFGWB RH7592 residues may accumulate in soil with repeated applications over multiple growing seasons. Its persistence and relative lack of mobility indicates that it could reach surface water via runoff following rainfall or irrigation.

Estimated Environmental Concentrations

According to the RH7592 label, approximately 2 lbs of active ingredient are contained in each gallon of RH7592 2F. The maximum rate of application is 0.125 active ingredient per acre.

A presumption of no risk to non-target organisms is calculated from acute toxicity studies using $EEC < 1/5$ the LD50 and LC50's for terrestrial organisms and $EEC < 1/10$ the LC50 and EC50's for aquatic organisms. For endangered species the $EEC < 1/10$ the LD50 and LC50's for terrestrial organisms and $EEC < 1/20$ the LC50 and EC50's for aquatic organisms. For EEC's above these values risk can be presumed.

Terrestrial Exposure

Therefore, the maximum estimated environmental concentrations after the first application of RH7592 on various types of vegetation in ppm (Hoerger and Kanaga, 1972) are as follows:

**PPM Residue on the Basis of
RH7592 Dosage of 0.1 & 0.125 lb per Acre**

Plant Category	Upper limit		Typical limit	
	0.1	0.125	0.1	0.125
Short Grass	24	30	13	16
Long Grass	11	14	9.6	12
Leaves & Leafy Crops	13	16	3	4
Forage Crops	6	7	3	4
Pods Containing Seeds	1.6	2	0.3	0.4
Grain	0.8	1	0.3	0.4
Fruit	0.7	0.9	0.2	0.2

As RH7592 has shown to be persistent in the environment and the label recommends multiple applications at 10 day intervals (up to 1 lb active ingredient per season) using mist blowers or airblast methods, a daily accumulated residue model (EEB's FATE Computer Model) was run on both short grass and pods containing seeds data. The results from these models compared to the risk criteria above indicate that maximum residue levels for short grass are 180-225 ppm.

**Potential Risk from Exposure to RH7592 on Terrestrial Vegetation
(Short Grass)**

Terrestrial Study	Risk Quotient	Risk Quotient
	Almonds & Ornamentals	Pecans & Stone Fruit
Avian Oral (Bobwhite Quail)	N/A	N/A
Avian Dietary -- Mallard Duck	0.09	0.11
-- Bobwhite Quail	0.04	0.05
Avian Reproduction -- Mallard Duck	1.2	1.5
-- Bobwhite Quail		
Mammalian Oral (rat)	N/A	N/A
Mammalian Reproduction -- rat	2.25	2.8

14

The estimated cumulative residues on short grass exceed levels of concern (acute LOC=0.1; chronic LOC=1) for endangered terrestrial species.

Aquatic Exposure

Based on the maximum label rate and the proposed application methods (mist blower and airblast), it is assumed that there may be inadvertent direct application to waterways. Therefore, using the maximum label rates (0.1 & 0.125 a.i.lb/A), the estimated residues in aquatic environments are as follows:

I. Direct Application Model

This model is used when aquatic habitat is in close proximity to the target site; assumes direct application to a 6 inch and 6 foot body of water.

Application rate (lbs a.i./A) X 734 ppb (or 61 ppm) = EEC

Calculation for 6 inch water layer:

0.1 lbs. a.i./A X 734 ppb = 73.4 ppb (0.0734 ppm)

0.125 lbs a.i./A X 734 ppb = 91.75 ppb (0.0918 ppm)

Calculation for 6 foot body of water:

0.1 lbs. a.i./A X 61 ppb = 6.1 ppb (0.0061 ppm)

0.125 lbs a.i./A X 61 ppb = 7.6 ppb (0.0076 ppm)

II. Spray Drift Model

This model is used when application methods include aerial sprays, mist blowers, aerial fogs, etc. and aquatic habitat is distinctly separate from target site and label restricts direct treatment; assumes drift into a 6 inch layer of water or pounds lost to adjacent aquatic habitat.

Application rate (lbs a.i./A) X 5% drift = drift loading

0.1 lbs a.i./A X 0.05 = 0.005 lbs

0.125 lbs a.i./A X 0.05 = 0.00625 lbs

(drift loading) X 734 ppb = EEC

0.005 lbs X 734 ppb = 3.67 ppb (0.0037 ppm)

0.00625 lbs X 734 ppb = 4.59 ppb (0.0046 ppm)

III. Runoff Model

For pesticide active ingredients with high binding affinities (e.g., water solubility < 1 ppm; or octanol-water partition coefficient > 1000.

Application rate (lbs a.i./A) X (1% loss rate) X (10 acre basin) = runoff loading

0.1 lbs a.i./A X 0.01 X 10 acres = 0.01 lbs
 0.125 lbs a.i./A X 0.01 X 10 acres = 0.012 lbs

IV. Indirect Exposure Model

Assumes total loading into a 6 acre*foot water body.

(spray drift loading + runoff loading) X 61.2 ppb = EEC
 (0.005 lbs + 0.01 lbs) X 61.2 ppb = 0.92 ppb (0.0009 ppm)
 (0.00625 lbs + 0.012 lbs) X 61.2 ppb = 1.12 ppb (0.0012 ppm)

Potential Risk to Aquatic Organisms from Exposure to RH7592
 at the 0.1 lbs a.i./A and 0.125 lbs. a.i./A label rates

Organism	Direct Exposure Risk Quotient		Indirect Exposure Risk Quotient	
	0.1	0.125	0.1	0.125
Freshwater Fish				
Acute	0.106	0.135	.001	.002
Chronic	0.9	1.12	0.01	0.014
Freshwater Invertebrate				
Acute	0.03	0.04	<0.001	<0.001
Chronic	0.94	1.18	0.01	0.01
Estuarine (Acute)				
Fish	0.04	0.05	<0.001	<0.001
Shrimp	0.12	0.15	0.001	0.002
Oyster	0.11	0.13	0.001	0.002

Direct exposure to 6 inches of water from a single application can exceed levels of risk concern, but indirect exposures from drift and runoff are below levels of concern.

As RH7592 has shown to be persistent in the environment and the label recommends multiple applications at 10 day intervals (up to 1 lb active ingredient per season) using mist blowers or airblast methods, a daily accumulated residue model (EEB's FATE Model) was run on residue models for direct application in 6 inch and 6 foot bodies of water, and spray drift application model. Results from these models compared to the risk criteria above indicate residue levels exceed acute levels of concern for non-target as well as endangered fish species in the 6 inch bodies of water. For the spray drift model, accumulated residues will exceed levels of risk for only endangered warmwater fish species.

To complete an aquatic risk assessment, data are needed from a fish life-cycle study.

16

Endangered Species

Levels of concern for endangered species are exceeded for chronic exposures to birds and mammals and for direct exposure occurrences for fish. These risk concerns can be mitigated by adhering to the 75 foot set-back (buffer zone) proposed by the registrant and limiting the number of repeat applications or maximum seasonal application rate. If these measures are not taken, a may affect situation would exist that could require a formal Sec. 7 consultation with the Fish and Wildlife Service.

Adequacy of Toxicity Data

The following list of studies are needed to complete EEB's ecological risk assessments on RH7592.

- 72-5 Fish full life-cycle using TGAI of RH7592.
- 123-2 Growth and Reproduction of Aquatic Plants - Tier 2 using the TGAI of RH7592.

In addition, due to the persistence of RH7592 and the proposed use patterns, to appropriately estimate the effects of spray drift on surrounding habitats EEB recommends that EFGWB requests the following data:

- 201-1 Droplet Size Spectrum
- 202-1 Drift Field Evaluation

Precautionary Labeling

It is recommended that the following statement be included on the label:

This pesticide is highly toxic to fish and may impair reproduction in birds and small mammals. Do not apply directly to water, or to areas below the mean high water mark. Drift and runoff from treated area may be hazardous to aquatic organisms in adjacent aquatic sites. Do not contaminate water when disposing of equipment washwaters and rinsates.

Conclusions

Based on the available toxicity data submitted by the registrant and the known persistence of RH7592 in the environment, RH7592 may pose a chronic risk to birds and mammals. Pertinent data are lacking for fish species. Minimal acute risk to all non-target organisms is expected, except for inadvertent direct overspray to adjacent aquatic habitat. Risk concerns can be mitigated by use restrictions which require a 75 foot set-back (buffer zone) between the treatment area and adjacent aquatic habitat and a reduction in the number of repeat applications and/or the maximum seasonal application rate.