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

DATA ACCESSION NO(S). _____

PRODUCT MANAGER NO. S. Lewis (21)

PRODUCT NAME(S) Folicur 3.6 F (3125-GOU), Raxil 0.26 F

(3125-GOE), Raxil 2.6 F (3125-GOG)

COMPANY NAME Mobay Corporation

SUBMISSION PURPOSE Proposed registration of new chemical for
use on wheat, barley, oats, grasses grown for seed and peanuts

SHAUGHNESSEY NO.	CHEMICAL AND FORMULATION	% A.I.
_____	<u>Tebuconazole</u>	_____
_____	_____	_____
_____	_____	_____



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

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

MEMO

SUBJECT: Tebuconazole proposed registration

TO: William Evans
Special Projects and Science Management Staff
Environmental Fate and Effects Division

FROM: James Akerman, Chief
Ecological Effects Branch
Environmental Fate and Effects Division

Attached are the Disciplinary Review, Topical Summary and Data Requirements for the proposed registration of tebuconazole. I wish to point out that it will be necessary for the Ecological Effect Branch to initiate a formal Section 7 consultation with the Office of Endangered Species when data from the required studies become available. If you have any questions, please contact Skip Houseknecht at 557-4372.

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TEBUCANOZOLE

Ecological Effects Chapter

1.0 Effects on Birds

Six studies, within six references, were received and evaluated under this topic. Five studies are acceptable for use in the hazard assessment.

<u>Authors</u>		<u>MIRD No.</u>
Stubblefield	1987	407009-05
Toll	1988	407009-07
Toll	1988	407007-08
Paulahn	1984	407009-06
Toll	1988	407009-09
Toll	1988	407009-10

The minimum data required to established the acute and subacute toxicity of tebuconazole to birds (using the technical grade active ingredient) are as follows:

- ° An avian single-dose acute oral LD50 study using one of the two species tested for the avian dietary LD50, preferably the mallard, Bobwhite quail, other native quails, or the ring-necked pheasant;
- ° A subacute dietary LC50 study on one species of waterfowl, preferably the mallard duck; and
- ° A subacute dietary LC50 study on one species of upland game bird, preferably the Bobwhite quail, other native quails, or the ring-necked pheasant.

1.0.1 Avian Acute Oral toxicity - Technical

The acceptable acute oral LD50 study is listed below:

<u>Species</u>	<u>% AI</u>	<u>LD50 mg/kg</u>	<u>Authors</u>	<u>Year</u>	<u>MIRD</u>	<u>Fulfills Guideline Requirements</u>
Bobwhite quail	94.7	1988	Stubblefield	1987	407009-05	Yes

There is sufficient information to characterize tebuconazole as slightly toxic to the quail. The avian

acute oral LD50 guidelines requirements have been satisfied.

1.0.2 Avian Dietary Toxicity - Technical

Acceptable dietary LC50 studies are listed below:

<u>Species</u>	<u>% AI</u>	<u>LC50 ppm mg/kg</u>	<u>Authors</u>	<u>Year</u>	<u>MIRD</u>	<u>Fulfills Guideline Requirements</u>
Mallard duck	96.28	>4816	Toll	1988	407009-07	Yes
Bobwhite	96.28	>5000	Toll	1988	407009-08	Yes

There is sufficient information to characterize tebuconazole as practically non-toxic to mallard ducks and Bobwhite quail. The avian dietary LC50 guidelines have been satisfied.

1.0.3 Avian Dietary Toxicity-Formulated Product

No studies were reviewed under this category and none are required.

1.0.4 Avian Reproduction Studies

Avian reproduction studies are required for technical tebuconazole because repeated applications and the very persistent nature of the pesticide could subject birds to continuous exposure.

Acceptable reproduction studies are listed below:

<u>Species</u>	<u>% AI</u>	<u>No Effect Dose-ppm</u>	<u>Authors</u>	<u>Year</u>	<u>MIRD</u>	<u>Fulfills Guideline Requirements</u>
Mallard duck	97.4	75.8	Toll	1988	407009-09	Yes
Bobwhite quail	97.4	73.5	Toll	1988	407009-10	Partial ¹

The above studies indicate that feeding tebuconazole (97.4% ai) up to 73 ppm will not produce any treatment-

¹ The highest levels tested were 80 ppm. This is less than estimated residue levels expected from the use of Lynx end-use products on turf (see attachment).

related effects in mallard ducks or bobwhite quail.

Precautionary Labeling

Based upon the data in the above section, no precautionary statement for wildlife is required for tebuconazole.

1.1 Effects on Freshwater Invertebrates

1.1.1 Technical

Two studies in two references were received and evaluated under this topic. Both were acceptable for use in a hazard evaluation.

Authors

MIRD No.

Forbis
Burgess

407009-13
407009-15

The minimum data required to establish the acute toxicity of tebuconazole to freshwater invertebrates are the results from an acute LC50 study using technical grade compound. Test organisms should be first instar daphnids or early instar amphipods, stoneflies, or mayflies. Daphnids shall be tested for 48 hours. The acceptable study is:

<u>Species</u>	<u>% AI</u>	<u>LC50 mg/L</u>	<u>Authors</u>	<u>Year</u>	<u>MIRD</u>	<u>Fulfills Guideline Requirements</u>
<u>Daphnia</u>	96	4.2	Forbis	1988	407009-13	Yes

There is sufficient information to characterize technical tebuconazole as moderately toxic to freshwater invertebrates.

1.12 Formulated Product

No studies were reviewed under this category.

Acute aquatic toxicity studies on aquatic invertebrates using Lynx 1.2 or Folicur 1.2 EC are required because ingredients in the end-use products other than the active ingredient are expected to enhance the toxicity of the active ingredient or to cause toxicity to aquatic organisms (Subdivision E Guidelines, Section 72-2, (b)(1)(ii)(c)).

1.1.3 Aquatic Invertebrate Life Cycle

The aquatic invertebrate life cycle test on technical

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tebuconazole is required to support the registration of the end-use products because of the product is expected to be transported to water from the intended use site and because the product is extremely resistant to hydrolysis (half-life is greater than 28 days).

The acceptable chronic toxicity data are listed below:

<u>Species</u>	<u>% AI</u>	<u>MATC¹</u> <u>mg/L</u>	<u>Authors</u>	<u>Year</u>	<u>MIRD</u>	<u>Fulfills</u> <u>Guideline</u> <u>Requirements</u>
<u>Daphnia</u>	96	>0.12<0.23	Burgess	1988	.407009-15	Yes

- 1 Maximum acceptable toxicant concentration-based on survival, reproduction, and growth of the first generation of daphnids.

Precautionary Labeling

Based upon the above data, a precautionary statement for aquatic invertebrates is not required at this time.

1.2 Effects on Freshwater Fish

1.2.1 Technical

Three studies in three documents were evaluated under this topic. All were found to be acceptable.

<u>Authors</u>	<u>MIRD No.</u>
Surprenant	407009-11
Surprenant	407009-12
Surprenant	407009-14

The minimum data required for establishing the acute toxicity of tebuconazole to freshwater fish are the results from two 96 hour LC50 studies using the technical grade material. The studies should include a cold water species, preferably rainbow trout, and one warmwater species, preferably bluegill.

The acceptable studies are:

<u>Species</u>	<u>% AI</u>	<u>LC50</u> <u>mg/L</u>	<u>Authors</u>	<u>Year</u>	<u>MIRD</u>	<u>Fulfills</u> <u>Guideline</u> <u>Requirements</u>
Rainbow Trout	94.7	4.4	Surprenant	1987	407009-11	Yes

Bluegill 96.0 5.7 Surprenant 1987 407009-12 Yes

There is sufficient information to characterize tebuconazole as moderately toxic to freshwater fish. The Guideline requirements for freshwater fish acute LC50 data with technical tebuconazole have been met.

1.2.2 Formulated Product

No studies were reviewed under this category.

Acute aquatic toxicity studies on freshwater fish using Lynx 1.2 or Folicur 1.2 EC will be required because ingredients in the end-use products other than the active ingredient are expected to enhance the toxicity of the active ingredient or to cause toxicity to aquatic organisms (subdivision E Guidelines, Section 72-2, (b)(1)(ii)(c)).

1.2.3 Freshwater Fish Early Life Stage

The freshwater fish early life stage test on technical tebuconazole is required to support the registration of the end-use products because the product is expected to be transported to water from the intended use sites and because the product is extremely resistant to hydrolysis (half-life is greater than 28 days).

The acceptable chronic toxicity data are listed below:

<u>Species</u>	<u>% AI</u>	<u>MATC¹</u> <u>ug/L</u>	<u>Authors</u>	<u>Year</u>	<u>MIRD</u>	<u>Fulfills</u> <u>Guideline</u> <u>Requirements</u>
Rainbow Trout	96	>12<25	Surprenant	1988	407009-14	Yes

- 1 Maximum acceptable toxic concentration-based on larval survival.

1.2.4 Freshwater Fish Full Life Cycle

The freshwater fish full life cycle test on technical tebuconazole is required to support the registration of the end-use products because the product is expected to be transported to water from the extended use sites and because the expected environmental concentrations on turf exceed the rainbow trout MATC by more than 60 times.

Precautionary Labeling

Based upon the above data a precautionary statement for

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freshwater fish is not required at this time.

1.3 Effects on Estuarine and Marine Organisms

Three studies were reviewed under this category. All were found to be acceptable.

<u>Author</u>	<u>MIRD No.</u>
Surprenant	409959-02
Surprenant	409959-03
Surprenant	409959-04

Acute toxicity studies with estuarine and marine organisms are needed for hazard evaluation, as per Section 163.72-3(a), because the proposed registration for use on turf (Terrestrial-Nonfood) and peanuts (Terrestrial-Food) suggests that tebuconazole may be applied in coastal counties of the U.S. and because of the relatively high solubility and persistent nature of the pesticide. Acute studies are required on the technical as well as Lynx 1.2 or Folicur 1.2 EC for the reasons stated in Sections 1.1.2 and 1.2.2 of this document.

The minimum data needed to establish the acute toxicity of tebuconazole to marine and estuarine fauna are:

- ° A 96 hour acute toxicity test on an estuarine or marine shrimp,
- ° A 96 hour acute toxicity test on an estuarine or marine fish, and
- ° Either a mollusc 96 hour flow-through shell disposition study or a mollusc 48 hour embryo-larvae study.

The acceptable studies are listed below:

<u>Species</u>	<u>% AI</u>	<u>LC50 mg/L</u>	<u>Authors</u>	<u>Year</u>	<u>MIRD</u>	<u>Fulfills Guideline Requirements</u>
Mysid shrimp	96.28	0.47	Surprenant	1988	409959-02	Yes
Eastern oysters	96.28	2.7	Surprenant	1988	409959-03	Yes
Sheepshead minnows	96.28	5.9	Surprenant	1988	409959-04	Yes

Technical tebuconazole is highly toxic to mysid shrimp and moderately toxic to eastern oysters and sheepshead minnows. Acute aquatic toxicity studies on marine invertebrates using Lynx 1.2 or Folicur 1.2 EC will be required because ingredients in the end-use products other than the active ingredient are expected to enhance the toxicity of the active ingredient or to cause toxicity to aquatic organisms (subdivision E Guidelines, Section 72-2, (b)(1)(ii)(c)).

Precautionary Labeling

Based upon the above data, the following precautionary labeling is required:

"This pesticide is toxic to estuarine and marine invertebrates. Do not contaminate water when disposing of equipment washwater or rinsate."

1.4 Plant Protection

One study was evaluated under this topic. It was judged supplemental and not satisfactory to fulfill guideline requirements.

AUTHOR

Heimbach

MIRD No.

409959-08

Tier data on Non-Target Area Phytotoxicity to Selenastrum capricornutum are required for fungicides used on terrestrial non-crop areas. Testing is required because fungicides are typically toxic to algae and the relative high water solubility (25 ppm) of tebuconazole makes exposure to algae a concern. The guideline requirements have not been satisfied. Higher tier testing may be required pending the results of these tests.

Precautionary Labeling

Presently we cannot determine if a toxicity statement is warranted for non-target plant protection, because no acceptable data are available.

1.5 Field Studies - Terrestrial and Aquatic

No study was received under this topic. The requirement for terrestrial and aquatic field studies is reserved pending the results of environmental fate studies and the results of other studies required above.

Ecological Effects

Disciplinary Review - Tebuconazole

1.0 Ecological Effects Profile

1.1 Avian Studies

There is sufficient information to characterize technical tebuconazole as slightly toxic on an acute oral basis to the bobwhite quail, with a LD50 of 1988 mg/kg (Stubblefield 1987, 407009-05).

Avian dietary toxicity data indicate that tebuconazole is practically non-toxic to mallard ducks and bobwhite quail, with a LC50 value of greater than 4816 mg/L for both species (Toll 1988, 407009-07 and -08)

Avian Reproduction studies indicate that feeding tebuconazole (97.4% a.i.) up to 73 ppm will not produce any treatment-related effects in mallard ducks or bobwhite quail (Toll 1988, 407009-09 and -10).

1.2 Aquatic Studies

Freshwater invertebrate acute toxicity data show that tebuconazole is moderately toxic to Daphnia, with an LC50 value of 4.2 mg/L (Forbis 1988, 407009-13). Additional chronic toxicity data indicate that tebuconazole's MATC value for Daphnia is greater than 0.12 mg/L but less than 0.23 mg/L based on survival, reproduction, and growth of the first generation of daphnids. (Burgess 1988, 407009-15).

Freshwater fish acute toxicity data indicate that tebuconazole is moderately toxic to bluegill sunfish, with an LC50 value of 5.7 mg/L, and rainbow trout with an LC50 value of 4.4 mg/L (Surprenant 1987, 407009-11 and -12). Additional chronic toxicity data indicate that tebuconazole's MATC value for trout is greater than 12 ug/L but less than 25 ug/L based on larval survival (Surprenant 1988, 407009-14).

1.3 Estuarine/Marine Studies

Estuarine/Marine studies show that technical tebuconazole is highly toxic to mysid shrimp with an LC50 value of 0.49 ppm (Surprenant 1988, 409959-02) and moderately to eastern oysters and sheepshead minnows with LC50 values of 2.7 ppm and 5.9 ppm, respectively (Surprenant 1988, 409959-03 and -04).

1.4 Formulated Products

No studies were evaluated under this topic.

2.0 Hazard Assessment

2.1 Formulations and Use

Tebuconazole is a broad-spectrum systemic fungicide developed for use on terrestrial nonfood crops (grasses grown for seed), food crops (oats, barley, wheat, peanuts) and domestic outdoor (lawns and turf) use sites. Mobay Corporation is proposing registration of this new product. In addition to the technical material, tebuconazole is presently formulated as eight end-use products. No tebuconazole end-use product contains multiple active ingredients. Application is made by using ground or aerial equipment, including solid set irrigation systems.

Formulated product use rates are listed below.

<u>Site</u>	<u>Rate (lbs ai/acre)</u>	<u>Maximum/Growing Season (lbs ai/A)</u>
Barley (seed trt.)	0.002/ 100 lbs. seed	1
Oats (seed trt.)	0.002/ 100 lbs. seed	1
Wheat (seed trt.)	0.002/ 100 lbs. seed	1
Grass for seed	0.11 - 0.22	0.45 2,5
Wheat	0.11 - 0.22	0.45 2,5
Barley	0.11 - 0.22	0.45 2,5
Peanuts	0.18 - 0.22	1.58 2,5
Turf	0.15 - 1.17	* 3
Turf	0.17 - 1.33	* 4
Turf	0.60 - 2.40	* 6
Grapes	0.06 - 0.11	0.90 5

* Not specified

¹ RAXIL 2.6 F, RAXIL 0.26 F

² FOLICUR 3.6 F, FOLICUR 1.2 EC

³ LYNX 2 F

⁴ LYNX 25 F

⁵ ELITE 45 DF

⁶ LYNX 1.2

2.2 Environmental Fate and Residues

Tebuconazole is soluble in water to 25 ppm; volatilization is negligible. It is resistant to hydrolysis (acidic or basic), photodegradation in water and aerobic or anaerobic biological degradation. It is slowly degraded on soil (half-life is 191 days) and is immobile in sand, sandy loam, silt loam and silty clay

loam soil. It does not trigger a ground water concern.

2.3 Terrestrial Risk Assessment

There is sufficient information to characterize tebuconazole as slightly toxic on an acute oral basis to the bobwhite quail, with an LD50 of 1988 mg/kg. Avian dietary toxicity data indicate that tebuconazole is practically nontoxic to mallard ducks and bobwhite quail, with an LC50 value of greater than 4816 ppm for both species. Avian reproduction studies indicate that dietary tebuconazole up to 73 ppm (the highest level tested) will not produce any treatment related effects in mallard ducks or bobwhite quail.

The following residues may be expected on a variety of terrestrial wildlife dietary matter immediately after one application of the following formulated products.

End Use Product*

<u>Crop</u>	<u>2 and 5</u>	<u>3</u>	<u>4</u>	<u>6</u>
Short grass	53	281	319	576
Long grass	24	129	146	264
Leaves, leafy crops	28	146	166	300
Forage, small insects	13	68	77	139
Pods, large insects	3	14	16	29
Fruits	2	8	9	17

* See key at the bottom of the preceding table.

RAXIL 2.6 F and RAXIL 0.26 F are proposed for use only as a seed treatment on wheat, oats and barley at the rate of 0.002 lbs. ai/100 lbs. of seed. With an average of 90 lbs. of seed per acre and 14,000 seeds per lb., each seed would carry approximately 0.0007 mg of tebuconazole. Further, at the above rates, each square foot of soil surface would contain approximately 0.02 mg of active ingredient. Granivorous birds would be unable to consume a sufficient number of seeds to exceed 1/5th of the LC50 for bobwhite quail(> 50,000 seeds for a bird the size of a bobwhite quail, > 8,000 seeds for a bird the size of a field sparrow). The use of RAXIL is not expected to adversely affect nontarget species.

For other formulations of tebuconazole the subacute dietary LC50's are much larger than dietary residues anticipated at the highest application rate. Chronic effects can not be evaluated completely at this time because field dissipation data are not available. Reproductive hazard cannot be ruled out because the continuous exposure, no reproductive effects dose was

73.5 ppm, nearly eight times less than the estimated maximum exposure level of 576 ppm for LYNX 1.2. The persistence and possible accumulation of this pesticide cause concern for adverse effects to birds and mammals in the long term. A bobwhite quail avian reproduction must be repeated to support the maximum rate for LYNX and the maximum seasonal rate for Folicur.

2.4 Aquatic Risk Assessment

The available data on Folicur indicate the technical is moderately toxic to aquatic species. The most sensitive aquatic organism for which data are available is Daphnia magna, with a LC50 of 4.2 ppm. Available chronic data indicate that rainbow trout reproduction may be adversely impacted if exposed on a continuous basis to 17.3 ppb (12 > MATC < 23 ppb).

Using the standard scenario of a 10-acre watershed draining into a one-acre pond six feet deep, the maximum expected environmental concentrations (EEC) from one application is given below.

	EEC (ppb)	
	Ground App.	Aerial App.
RAXIL 2.6 F, RAXIL 0.26 F	N.A.	N.A.
FOLICUR 3.6 F, Folicur 1.2 EC	6.7	4.7
LYNX 1.2	73.2	N.A.
LYNX 2 F	35.7	N.A.
LYNX 25 F	40.6	N.A.
ELITE 45 DF	6.7	4.7

N.A. = Not applicable

With the exception of the use of LYNX 1.2 on turf, there is no concern for possible adverse effects to nontarget species from a single application because maximum EECs are less than 1/10th the LC50 for the most sensitive species tested (mysid shrimp). The maximum label rate for LYNX 1.2 yields aquatic EECs that are nearly 1/5th the LC50 for mysid shrimp and may result in adverse effects to aquatic invertebrates. In addition, chronic toxicity could be a problem because the MATC for rainbow trout is considerably less than runoff concentrations expected from a single application of each of the LYNX end use products.

The major concern is with repeat applications. Given that environmental fate studies showed no degradation after 28 days in waters ranging from pH 5 to pH 9, residues could rise to levels that would adversely affect freshwater and estuarine species.

An additional area of concern centers around the potential for biological accumulation in the food chain. Results from an acceptable fish bioaccumulation study must be evaluated before the potential hazard to aquatic organisms can be assessed fully.

2.5 Endangered Species Risk Assessment

The endangered species trigger of 1/20th the LC50 is exceeded by expected residues on short grass. Previous Section 7 consultations have shown that the Attwaters prairie chicken and the Aleutian Canada goose are associated with small grains and thus they could be adversely affected by this proposal. In addition, grass-eating waterfowl such as the Hawaiian goose and the Aleutian Canada goose could be impacted. The Mohave Tui chub is associated with golf courses and might also be affected by the use of Lynx products (for the same reasons stated in Section 2.4 above). Freshwater mussels are not expected to be adversely affected because EEC's do not exceed 1/20th the LC50 for Eastern oysters (2.7 ppm).

A previous Section 7 consultation for the use of Captafol fungicide on peanuts listed two species of concern, the wood stork and the Everglades kite. In both cases the concern was for adverse effects to the food supplies of the species. Tebuconazole is only moderately toxic to fish and mollusks (the major food items of the stork and kite) and no harm is expected to come to these species as a result of the proposed registration of tebuconazole.

3.0 Precautionary Labeling

3.1 Manufacturing Use

"This pesticide is toxic to estuarine invertebrates. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or public water unless this product is specifically identified and addressed in a NPDES permit. Do not discharge effluent containing this product to sewer systems without previously notifying the sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA."

3.2 Outdoor Uses

Non-seed Treatment

"This pesticide is toxic to estuarine invertebrates. Do not apply directly to water or to swamps, bogs, marshes or potholes. Drift and runoff may be hazardous to

aquatic organisms in neighboring areas. Do not contaminate water when disposing of equipment washwaters or rinsate."

Seed Treatment

"This pesticide is toxic to estuarine invertebrates. Do not contaminate water when disposing of equipment washwaters or rinsate."

3.3 Endangered Species

No precautionary labeling is required at this time.

TABLE A
Generic Data Requirements for Tebuconazole

Does EPA Have Enough Data to Satisfy This Requirement? Yes,				Must Additional Data be Submitted Under FIFRA		Time After Notification To Report Data
Data Requirement	Formulation ¹	Use Pattern ²	No, or Partially	Bibliographic Citation	Section 3(c)(2)(B)	
ECOLOGICAL EFFECTS						
§158.145 WILDLIFE AND AQUATIC ORGANISMS						
71-1 Avian Oral LD ₅₀	TGAI	A,B	Yes	407009-05	No	
71-2 Avian Dietary LC ₅₀ Upland Game	TGAI	A,B	Yes	407009-07	No	
Waterfowl	TGAI	A,B	Yes	407009-08	No	
71-3 Wild Mammal Toxicity	TGAI	A,B	No		Reserved ³	
71-4 Avian Reproduction	TGAI	A,B	Partially	407009-09 407009-10	Yes ⁴	24 months
71-5 Simulated and Actual Field Testing with Mammals and Birds	TEP	A,B	No		Reserved ⁵	
72-1 Freshwater Fish Warm Water	TGAI	A,B	Yes	407009-12	No	
	TEP	A,B	No		Yes ⁶	12 months
Cold Water	TGAI	A,B	Yes	407009-11	No	
	TEP	A,B	No		Yes ⁶	12 months
72-2 Acute LC ₅₀ Freshwater Invertebrates	TGAI	A,B	Yes	407009-13	No	
	TEP	A,B	No		Yes ⁶	12 months
72-3 Acute LC ₅₀ for Estuarine and Marine Organisms	TGAI	A,B	Yes	409959-02,-03,-04	No	
	TEP	A,B	No		Yes ⁶	12 months

Does EPA Have Enough Data to Satisfy This Requirement? Yes,				Must Additional Data be Submitted Under FIFRA		Time After Notification To Report Data
Data Requirement	Formulation ¹	Use Pattern ²	No, or Partially	Bibliographic Citation	Section 3(c)(2)(B)	
72-4 Fish Early Life Stage and Aquatic Invertebrate Life Cycle Freshwater	TGAI	A,B	Yes	407009-14,-15	No	12 months
Marine	TGAI	B	No		Yes ⁷	
72-5 Fish Life Cycle	TGAI	B	No		Yes ⁸	
72-6 Aquatic Organism Accumulation	TGAI	A,B	No		No ⁹	
72-7 Simulated or Actual Field Testing - Aquatic Organisms	TGAI	B	No		Reserved ¹⁰	
§158.150 PLANT PROTECTION						
121-1 Target area Phytotoxicity	TEP	A,B	No ¹¹			
122-1 Seedling Germination/Seedling Emergence	TGAI	A,B	No		No	
122-1 Vegetative Vigor	TGAI	A,B	No		No	
122-2 Aquatic Plant Growth	TGAI	A,B	No		Yes ¹²	12 months
123-1 Seed Germination/Seedling Emergence	TGAI	A,B	No		No	
123-2 Vegetative Vigor	TGAI	A,B	No		No	
123-2 Aquatic Plant Growth	TGAI	A,B	No		Reserved ¹³	
124-1 Terrestrial Field	TEP	A,B	No		No	
124-2 Aquatic Field	TEP	A,B	No		Reserved ¹⁴	

1. TGAI = Technical grade of the active ingredient, TEP = Typical end product.

2. The use patterns are coded as follows: A = Terrestrial, crop, B = Terrestrial, noncrop.
3. Reserved pending evaluation of mammalian toxicity acute studies.
4. New study on bobwhite quail must be conducted to provide an effect/noeffect level sufficient to support the proposed rates greater than 0.45 lbs. ai/A/season.
5. Reserved pending avian reproduction, fish accumulation and plant residue studies.
6. Required to support Lynx 1.2 and Folicur 1.2 EC because ingredients in the end use product other than the active ingredient are expected to cause toxicity to aquatic organisms. Either Lynx 1.2 or Folicur 1.2 EC may be used for the test.
7. A fish study is required because of results of freshwater fish early life cycle test. Shrimp study required because acute toxicity to mysid shrimp and persistence of active ingredient.
8. This study is required because the EEC for turf exceeds the Fish Early Life Stage MATC.
9. Required by EFGWB.
10. Reserved pending receipt of outstanding fate studies.
11. Not currently a requirement.
- Phytotoxicity on Selenastrum capricornutum only.
13. Reserved pending results of Tier I studies.
14. Reserved pending results of Tier II studies.

Lynx 1.2 EEC CALCULATION SHEET

Attachment A

I. For foliar application

A. Runoff

$$2.40 \text{ lbs} \times \frac{0.05}{(\underline{5\%} \text{ runoff})} \times \frac{10 \text{ (A)}}{(\text{from 10 A. drainage basin})} = \frac{1.2}{(\text{tot. runoff})} \text{ lb}$$

EEC of 1 lb a.i. direct application to 1 A. pond 6-foot deep = 61 ppb

$$\text{Therefore, EEC} = 61 \text{ ppb} \times \underline{1.2} \text{ (lb)} = \underline{73} \text{ ppb}$$

II. For aerial application

A. Runoff

$$\underline{\hspace{2cm}} \text{ lbs} \times \frac{0.6}{(\text{appl. efficiency})} \times \frac{0.0}{(\underline{\hspace{1cm}}\% \text{ runoff})} \times \frac{10 \text{ (A)}}{(10 \text{ A. d. basin})} = \underline{\hspace{2cm}} \text{ lbs (tot. runoff)}$$

B. Drift

$$\underline{\hspace{2cm}} \text{ lbs} \times \frac{0.05}{(5\% \text{ drift})} = \underline{\hspace{2cm}} \text{ lb (tot. drift)}$$

$$\text{Tot. loading} = \underline{\hspace{2cm}} \text{ lb} + \underline{\hspace{2cm}} \text{ lb} = \underline{\hspace{2cm}} \text{ lbs}$$

$$\text{Therefore, EEC} = 61 \text{ ppb} \times \underline{\hspace{2cm}} \text{ (lbs)} = \underline{\hspace{2cm}} \text{ ppb}$$

Turf Use

Attachment A

Lynx 25F EEC CALCULATION SHEET

I. For foliar application

A. Runoff

$$\underline{1.33} \text{ lbs} \times \frac{0.05}{(\underline{5\%} \text{ runoff})} \times \frac{10 \text{ (A)}}{(\text{from 10 A. drainage basin})} = \underline{0.665} \text{ lb} \text{ (tot. runoff)}$$

EEC of 1 lb a.i. direct application to 1 A. pond 6-foot deep = 61 ppb

$$\text{Therefore, EEC} = 61 \text{ ppb} \times \underline{0.665} \text{ (lb)} = \underline{40.6} \text{ ppb}$$

II. For aerial application

A. Runoff

$$\underline{\quad} \text{ lbs} \times \frac{0.6}{(\text{appl. efficiency})} \times \frac{0.0}{(\underline{\quad\%} \text{ runoff})} \times \frac{10 \text{ (A)}}{(10 \text{ A. d. basin})} = \underline{\quad} \text{ lbs (tot. runoff)}$$

B. Drift

$$\underline{\quad} \text{ lbs} \times \frac{0.05}{(5\% \text{ drift})} = \underline{\quad} \text{ lb (tot. drift)}$$

$$\text{Tot. loading} = \underline{\quad} \text{ lb} + \underline{\quad} \text{ lb} = \underline{\quad} \text{ lbs}$$

$$\text{Therefore, EEC} = 61 \text{ ppb} \times \underline{\quad} \text{ (lbs)} = \underline{\quad} \text{ ppb}$$

LYNX 2 F EEC CALCULATION SHEET

I. For foliar application

A. Runoff

$$\underline{1.17} \text{ lbs} \times \begin{matrix} 0.05 \\ (5\% \text{ runoff}) \end{matrix} \times \begin{matrix} 10 \text{ (A)} \\ \text{(from 10 A.} \\ \text{drainage basin)} \end{matrix} = \underline{0.585} \text{ lb} \begin{matrix} \\ \text{(tot. runoff)} \end{matrix}$$

EEC of 1 lb a.i. direct application to 1 A. pond 6-foot deep = 61 ppb

Therefore, EEC = 61 ppb $\times$ 0.585 (lb) = 35.7 ppb

II. For aerial application

A. Runoff

$$\underline{\hspace{1cm}} \text{ lbs} \times \begin{matrix} 0.6 \\ \text{(appl. efficiency)} \end{matrix} \times \begin{matrix} 0.0 \\ (\% \text{ run-} \\ \text{off}) \end{matrix} \times \begin{matrix} 10 \text{ (A)} \\ \text{(10 A. d.} \\ \text{basin)} \end{matrix} = \underline{\hspace{1cm}} \text{ lbs (tot. runoff)}$$

B. Drift

$$\underline{\hspace{1cm}} \text{ lbs} \times \begin{matrix} 0.05 \\ (5\% \text{ drift}) \end{matrix} = \underline{\hspace{1cm}} \text{ lb (tot. drift)}$$

$$\text{Tot. loading} = \underline{\hspace{1cm}} \text{ lb} + \underline{\hspace{1cm}} \text{ lb} = \underline{\hspace{1cm}} \text{ lbs}$$

$$\text{Therefore, EEC} = 61 \text{ ppb} \times \underline{\hspace{1cm}} \text{ (lbs)} = \underline{\hspace{1cm}} \text{ ppb}$$

GRASSES GROWN FOR SEED, SMALL GRAINS

ELITE 45 DF

FOLIAR 3.6F

FOLIAR 1.2EC.

Attachment A

EEC CALCULATION SHEET

I. For foliar application

A. Runoff

$$\underline{0.22} \text{ lbs} \times \frac{0.05}{(\underline{5\%} \text{ runoff})} \times \frac{10 \text{ (A)}}{(\text{from 10 A. drainage basin})} = \underline{0.11} \text{ lb} \text{ (tot. runoff)}$$

EEC of 1 lb a.i. direct application to 1 A. pond 6-foot deep = 61 ppb

$$\text{Therefore, EEC} = 61 \text{ ppb} \times \underline{0.11} \text{ (lb)} = \underline{6.7} \text{ ppb}$$

II. For aerial application

A. Runoff

$$\underline{0.22} \text{ lbs} \times \frac{0.6}{(\text{appl. efficiency})} \times \frac{0.05}{(\underline{5\%} \text{ runoff})} \times \frac{10 \text{ (A)}}{(10 \text{ A. d. basin})} = \underline{0.066} \text{ lbs (tot. runoff)}$$

B. Drift

$$\underline{\quad} \text{ lbs} \times \frac{0.05}{(5\% \text{ drift})} = \underline{\quad} \text{ lb (tot. drift)}$$

$$\text{Tot. loading} = \underline{0.066} \text{ lb} + \underline{0.011} \text{ lb} = \underline{0.077} \text{ lbs}$$

$$\text{Therefore, EEC} = 61 \text{ ppb} \times \underline{0.077} \text{ (lbs)} = \underline{4.7} \text{ ppb}$$