4-29-94

DP Barcode : D198525
PC Code No : 128997
EEB Out :

To: Susan Lewis/Benjamin Chambliss
Product Manager
Registration Division 7505C

From: Anthony F. Maciorowski, Chief
Ecological Effects Branch/EFED 7507C

Attached, please find the EEB review of...

Reg./File # :
Chemical Name : Tebuconazole
Type Product : Fungicide
Product Name : Folicur
Company Name : Miles INc.
Purpose : Review of use on peanuts

Action Code : 101 Date Due : 5/24/94
Reviewer : Conchi Rodríguez Date In EEB: 2/9/94

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

(1)

~~10~~

DP BARCODE: D198525

CASE: 192685 DATA PACKAGE RECORD DATE: 01/24/94
SUBMISSION: S456847 BEAN SHEET Page 1 of 1

* * * CASE/SUBMISSION INFORMATION * * *

CASE TYPE: REGISTRATION ACTION: 101 RESB NC-FOOD/FEED USE
RANKING : 35 POINTS (KO)
CHEMICALS: 128997 Tebuconazole 38.7000%

ID#: 003125-GOU FOLICUR 3.6 F
COMPANY: 003125 MILES INC
PRODUCT MANAGER: 21 SUSAN LEWIS 703-305-5200 ROOM: CM2 217
PM TEAM REVIEWER: BENJAMIN CHAMBLISS 703-305-7382 ROOM: CM2 233
RECEIVED DATE: 12/09/93 DUE OUT DATE: 06/17/94

* * * DATA PACKAGE INFORMATION * * *

DP BARCODE: 198525 EXPEDITE: N DATE SENT: 01/24/94 DATE RET.: / /
CHEMICAL: 128997 Tebuconazole
DP TYPE: 001 Submission Related Data Package
CSF: N LABEL: Y

ASSIGNED TO	DATE IN	DATE OUT
DIV : EFED	02/08/94	/ /
BRAN: EEB	02/09/94	/ /
SECT:	/ /	/ /
REVR :	2/9/94	/ /
CONTR:	/ /	/ /

ADMIN DUE DATE: 05/24/94
NEGOT DATE: / /
PROJ DATE: / /

* * * DATA REVIEW INSTRUCTIONS * * *

Please review this revised labeling. These changes were discussed in a Dec.93 meeting as risk mitigation measures to address EEB concerns. Priority Points= 35 [K,O]

* * * DATA PACKAGE EVALUATION * * *

No evaluation is written for this data package

* * * ADDITIONAL DATA PACKAGES FOR THIS SUBMISSION * * *

DP BC	BRANCH/SECTION	DATE OUT	DUE BACK	INS	CSF	LABEL

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ECOLOGICAL EFFECTS BRANCH REVIEW

TEBUCONAZOLE (FOLICUR 3.6 F, FOLIAR FUNGICIDE)

100 Submission Purpose and Label Information

Pesticide Use

Miles Corporation is requesting registration of a new use for tebuconazole. This chemical will be used on peanuts for control of scletorium stem rot (white mold), rhizoctonia limb rot, early and late leafspot and leaf rust.

100.2 Formulation Information

Active Ingredient:

Tebuconazole, a-[2-(-Chlorophenyl)-ethyl]-a-(1,1-dimethylethyl)-1H-1,2,4-triazole-1-ethanol.....38.7%

Inert Ingredients.....61.3%

100.3 Application Methods, Directions, Rates

Folicur 3.6 F can be applied at a rate of 7.2 fluid ounces per acre (0.2025 lb a.i./acre) as a foliar spray. It is not to be applied through any type of irrigation system. A maximum of 28.8 fluid ounces per acre (0.81 lb a.i./acre) may be applied per harvest cycle. The first application is done before the disease becomes established and four consecutive applications must be made at 14 days intervals. Folicur 3.6 F may be applied up to the day of harvest.

100.4 Target Organisms

Scletorium stem rot (white mold), rhizoctonia limb rot, early and late leafspot and leaf rust.

100.5 Precautionary Labeling

The label should read as follows:

This pesticide is toxic to estuarine and marine invertebrates. Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high-water mark. Runoff may be hazardous to aquatic organisms in neighboring areas. Do not contaminate water when disposing of equipment washwater or rinsate.

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101 Hazard Assessment

Tebuconazole is a broad spectrum, systemic fungicide. It is stable in sterile water at 25 C and pH of 5, 7, and 9. Photodegradation in water takes place with half-life of approximately 600 days. The half-life in sandy loam soils under aerobic and anaerobic conditions is 610 and 400 days, respectively. Photodegradation in soil is more rapid with a half-life of 191 days. There is little potential for leaching.

101.1 Discussion

The data requirements for the registration of this manufacturing use product were submitted by Miles Inc.. A summary of the studies is presented here.

Guide. Ref. No.	Test Species	% a.i.	Test Type	Test Results	Study Status	MRID No.
71-1 (a)	Colinus virginianus	94.7	Avian Single Dose	LD50= 1988 mg/kg	Core	407009-05
71-2 (a)	Colinus virginianus	96.28	Acute Oral	LC50 = >5000 ppm	Core	407009-08
71-2 (b)	Anas platyrhynchos	96.28	Acute Oral	LC50 = >4816 ppm	Core	407009-07
71-4 (a)	Colinus virginianus	97	Avian Repro-duction	NOEC = 156 ppm[1]	Core	416242-01
71-4 (a)	Colinus virginianus	97.4	Avian Repro-duction	NOEC = 73.5 ppm[2]	Core	407009-10
71-4 (b)	Anas platyrhynchos	97.4	Avian Repro-duction	$NOEC_2$ = 75.8[2] ppm	Core	407009-09
71-4 (b)	Anas platyrhynchos	96.9	Avian Repro-duction	NOEC = 320 ppm[3]	Supp.	418183-01
72-1 (a)	Lepomis macrochirus	96.28	Acute Toxicity	LC50 = 5.7 ppm	Core	407009-12
72-1 (c)	Salmo gairdneri	96.28	Acute Toxicity	LC50 = 4.4 ppm	Core	407009-11
72-2(a)	Daphnia magna	96.28	Acute Toxicity	EC50 = 4.0 ppm	Core	407009-13

72-3 (a)	Cyprinodon variegatus	96.28	Acute Toxicity	LC50 = 5.9 ppm	Core	409959-04
73-3 (b)	Crassostrea virginica	96.28	Shell Deposition	EC50 = 2.7 ppm	Core	409959-03
73-3 (c)	Mysidopsis bahia	96.28	Acute Toxicity	LC50 = 0.49 ppm	Core	409959-02
72-4 (a)	Salmo gairdneri	96.3	Fish Early Life Stage	MATC 0.012-0.025 ppm	Core	407009-14
72-4 (a)	Cyprinodon variegatus	97.5	Fish Early Life Stage	MATC 0.022-0.048 ppm	Core	420382-02
72-4 (b)	Daphnia magna	96.28	Life Cycle	MATC 0.12-0.23 ppm	Core	407009-15
72-4 (b)	Mysidopsis bahia	97.5	Life Cycle	MATC 0.035-0.061 ppm	Core	420382-01

1. Based on treatment related lesions observed during necropsy.
2. Highest level tested. No effects were observed.
3. Based on number of hatchlings per hen.

101.2 Likelihood of Adverse Effects to Non-target Organisms

Terrestrial Organisms

Birds

The data submitted by the registrant showed that Tebuconazole is slightly toxic to bobwhite quail (LD50 = 1988 mg/kg) on an oral basis. It also shows that Tebuconazole is practically non-toxic to the bobwhite quail (LC50 >5000 ppm) and to the mallard duck (LC50 >4816 ppm) in dietary studies.

On an acute basis the residues found on short grass after a single application of 0.2025 lbs ai/acre and the maximum seasonal application rate of 0.81 lb ai/acre represent little risk to birds (See Appendix 1 for residues on different food items). The levels of concern (LOC) for birds are not exceeded (Table 1).

Table 1. Acute Avian Risk Quotients and LOC for the a single and maximum seasonal application of tebuconazole to peanuts (LC50 > 4816 ppm)

Use Site	Application Rate	Substrate (EEC)	Risk Quotient (EEC/LC50)	LOC
Peanuts	0.225 lbs ai (single application)	Short Grass (48.6 ppm)	0.01	HR ≥0.5 RU ≥ 0.2 ES ≥ 0.1
Peanuts	0.81 lb ai (seasonal application)	Short Grass (194.4 ppm)	0.04	High Risk ≥0.5 RU ≥ 0.2 ES ≥ 0.1

HR = High Risk, RU = Restricted Use, ES = Endangered Species

An avian reproduction study indicate that the NOEC and LOEC for the mallard duck are 320 and 611 ppm respectively. The affected parameter was the number of hatchling per pen. An avian reproduction study for the bobwhite quail indicate that the NOEC and LOEC are 156 and 320 ppm respectively. The NOEC value was based on treatment related lesions observed in necropsy. After 4 applications of tebuconazole, the estimated average residue and the estimated maximum residue in short grass are 112.9 ppm and 180.4 ppm (Appendix 2). The maximum residue is higher than the NOEC for the quail. The level of concern is triggered for this scenarios. However, since vegetation in the field is minimal (peanut vines) and no drift is expected to adjacent short grass (ground application only), exposure to birds will be primarily insects or peanut foliage. The maximum residue expected to be found on insects or forage occurs at the fourth application and is 43.4 ppm (Appendix 3). The risk quotient does not exceeds the level of concern, therefore there is small risk to birds (Table 2).

Table 2. Chronic Avian Risk Quotients and LOC for average and maximum residues on short grass for a period of 55 days when four applications of tebuconazole at a rate 0.2025 lb ai/acre were done. (NOEL = 156 ppm bobwhite quail)

Use Site	Residue During a 55 Day Period	Substrate (EEC)	Risk Quotient (EEC/NOEL)	LOC
Peanuts	Average Residue (for 55 days)	Short Grass (112.9 ppm)	0.72	High Risk ≥ 1
		Insects/Forage (27.1 ppm)	0.17	
Peanuts	Maximum Residue (during the last 13 days)	Short Grass (180.4 ppm)	1.15	High Risk ≥ 1
		Insects/Forage (43.3 ppm)	0.27	

HR = High Risk

Small Mammals

An acute rat study indicated that the LD50 is 3933 mg/kg. EEB estimates an LC50 value from the LD50, body weight and food consumption (See Appendix 4 for formula). A representative of a herbivore (meadow vole LC50 = 6238 ppm), a granivore (deer mouse LC50 = 24347 ppm) and of an insectivore (least shrew LC50 = 3575 ppm) were used to estimate the risk to small mammals. The risk quotients were estimated for a single application of tebuconazole and for the maximum seasonal application. The risk quotients did not exceed the levels of concern (Table 3), therefore there is a minimal risk to mammals.

Table 3. Risk Quotients, LOC, Expected foods, EEC (estimated environmental concentration) and LC50 for three small mammals representing different food preferences. See Appendix 2 for EEC calculations.

Use Sites	Application Rate	Species (LC50)	Expected Food (EEC ppm)	Risk Quotient	LOC
Peanuts	0.2025 lb ai/acre (single application)	Meadow Vole (6438 ppm)	Grasses (48.6)	0.007	HR ≥ 0.5 RU ≥ 0.2 ES ≥ 0.1
		Least Shrew (3575 ppm)	Insects (11.7)	0.003	
		Deer Mouse (24,347 ppm)	Seeds (2.4)	0.00009	
Peanuts	0.81 lbs ai/acre (seasonal application)	Meadow Vole (6438 ppm)	Grasses (191.4)	0.02	HR ≥ 0.5 RU ≥ 0.2 ES ≥ 0.1
		Least Shrew (3575 ppm)	Insects (47)	0.01	
		Deer Mouse (24,347 ppm)	Seeds (9.7)	0.0003	

HR = High Risk, RU = Restricted Use, ES = Endangered Species

Aquatic Organisms

Freshwater

The data submitted by the registrant showed that Tebuconazole is moderately toxic to the bluegill sunfish (LC50 = 5.7 ppm), to the rainbow trout (LC50 = 4.4 ppm) and to water flea (Daphnia magna) (LC50 = 4.0 ppm) on an acute basis.

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The results of a screening model to calculated the EEC, predicted a concentration of 1.2 ppb. This model takes into consideration the KOC, aerobic soil metabolism rate and spray drift. The EEC is based on one application of 0.2025 lb ai/A assuming 5% runoff two days after application to 6 feet deep pond (Appendix 5). No effects are expected for freshwater aquatic organisms on an acute basis. The levels of concern are not triggered for this scenario (Table 4).

Table 4. Acute Aquatic Organisms Risk Quotients and LOC for a single and maximum seasonal application of tebuconazole to peanuts two days after application. (LC50 = 4.0 ppm Daphnia)

Use Site	Application Rate	EEC 6 ft Pond	Risk Quotient (EEC/LC50)	LOC
Peanuts	0.225 lbs ai (single application)	0.0012 ppm	0.0003	HR ≥0.5 RU ≥ 0.2 ES ≥ 0.1
Peanuts	0.81 lb ai (seasonal application)	0.0048 ppm	0.0012	HR ≥0.5 RU ≥ 0.2 ES ≥ 0.1

HR = High Risk, RU = Restricted Use, ES = Endangered Species

Chronic studies show that the NOEC and LOEC for rainbow trout are 0.012-0.025 ppm respectively. The affected parameter for the trout was larval survival. The NOEC and LOEC for the sheepshead minnow are 0.022-0.048 ppm respectively. The affected parameter was reproductive success. Chronic studies for aquatic invertebrates showed that the NOEC and LOEC for the water flea (Daphnia magna) are 0.12-0.23 ppm respectively. The affected parameters were adult length and number of young produced. The rainbow trout seems to be the most sensitive aquatic organism.

The major concern is with repeat applications. Given that environmental fate studies show no degradation after 28 days in waters ranging from pH 5 to 9, residues could rise to levels that would adversely affect freshwater species. Since this chemical will be applied on alternate years in areas close to aquatic systems and because of the long half life, the EEC was calculated for the following time periods: (1) the first season when tebuconazole will be applied (first year), (2) end of second year when no application is to be made, and (3) the second season (third year).

For the first season, the average residues and maximum residues (Appendix 6) found at the end of the season, does not pose a chronic risk to aquatic organisms. The level of concern is not exceeded (Table 5).

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Table 5. Aquatic Chronic Risk Quotients and LOC for average and maximum residues expected to be found in 6 feet deep pond during a period of 55 days when four applications of tebuconazole at a rate 0.2025 lb ai/acre were done (NOEL = 0.012 ppm Rainbow Trout)

Use Site	Residue During a 55 Day Period	EEC 6 ft Pond	Risk Quotient (EEC/NOEL)	LOC
Peanuts	Average Residue (for 55 days)	0.0029 ppm	0.24	High Risk ≥ 1
Peanuts	Maximum Residue (during the last 13 days)	0.0046 ppm	0.38	High Risk ≥ 1

The residue found at the end of the second year (day 720) is 0.0020 ppm (Appendix 7). At the end of the second year no effects are expected for aquatic organisms. The Risk Quotient is 0.16.

At the beginning of the next season (third year), the residue is 0.0020 ppm (from the first year). A residue of 0.0012 ppm is added as a result of the first application (Appendix 8). At the fourth application the residue in water exceed the NOEL for the rainbow trout (12 ppb). This residue is expected to be present for over two weeks. Chronic effects for fish are expected as a result of the use tebuconazole at the time of the fourth application. The levels of concern are triggered for the maximum residue, therefore there is a risk for fish (Table 6).

Table 6. Third year Aquatic Chronic Risk Quotients and LOC for average and maximum residues expected to be found in 6 feet deep pond during a period of 55 days when four applications of tebuconazole at a rate 0.2025 lb ai/acre were done (NOEC = 0.012 ppm rainbow trout)

Use Site	Residue During a 55 Day Period	EEC 6 ft Pond	Risk Quotient (EEC/NOEC)	LOC
Peanuts	Average Residue (for 55 days)	0.0078 ppm	0.65	High Risk ≥ 1
Peanuts	Maximum Residue (during the last 13 days)	0.0125 ppm	1.04	High Risk ≥ 1

Estuarine/Marine Organisms

Tebuconazole is moderately toxic to estuarine organisms with an LC50 of 5.9 ppm for sheepshead minnow, 2.7 ppm

for eastern oyster. It is highly toxic to mysid shrimp (Mysidopsis bahia) with an LC50 of 0.49 ppm. The levels of concern were not triggered (Table 7) therefore, no acute risk is expected from the use of tebuconazole.

Table 7. Acute Estuarine/Marine Organisms Risk Quotients and LOC for a single and maximum seasonal application of tebuconazole to peanuts (LC50 = 0.49 ppm)

Use Site	Application Rate	EEC 6 ft Pond	Risk Quotient (EEC/LC50)	LOC
Peanuts	0.225 lbs ai (single application)	0.0012 ppm	0.002	HR ≥0.5 RU ≥ 0.2 ES ≥ 0.1
Peanuts	0.81 lb ai (seasonal application)	0.0048 ppm	0.009	HR ≥0.5 RU ≥ 0.2 ES ≥ 0.1

HR = High Risk, RU = Restricted Use, ES = Endangered Species

A mysid shrimp (Mysidopsis bahia) life cycle study showed that the NOEC and LOEC were 0.035-0.061 ppm respectively. The affected parameter was reproductive success.
No risk is expected for estuarine/marine organisms. The levels of concern are not triggered for the first season (first year) nor for second season (third year) of tebuconazole use (Table 8). Residues were only considered for the third year because they are higher than the previous years.

Table 8. Chronic Estuarine Organisms Risk Quotients and LOC during the third year for average and maximum residues expected to be found in 6 feet deep pond during a period of 55 days when four applications of tebuconazole at a rate 0.2025 lb ai/acre were done. (NOEC = 0.35 ppm mysid shrimp)

Use Site	Residues During a 55 Day Period	EEC 6 ft Pond	Risk Quotient (EEC/NOEC)	LOC
Peanuts	Average Residue (for 55 days)	0.0078 ppm	0.22	High Risk ≥ 1
Peanuts	Maximum Residue (during the last 13 days)	0.125 ppm	0.35	High Risk ≥ 1

101.3 Endangered Species Considerations

A risk to endangered fish is expected on a chronic basis. The following endangered fish have been associated with peanuts fields: gulf sturgeon, shortnose sturgeon, pallid sturgeon, okaloosa dater, bayou darter, leopard darter, waccamaw sturgeon, roanoke logperch. See Appendix 8 for a list of all endangered fish in the states and counties where peanuts is grown. At this time

consultation with the Fish and Wildlife Service would be required unless the counties are restricted in the label.

The risk to endangered species is based on the tier 1 exposure assessment. EEB recommends that a refine exposure assessment be conducted. The results of the exposure assessment might change the risk assessment.

The EEB also recommends limiting the number of applications to three. This will reduce the residue found at the end of the season below our level of concern.

After the above two measures are taken, the EEB will decide if a consultation with the Fish and Wildlife Service is still needed.

101.4 Risk Mitigation

The label states several risk mitigation measures. To mitigate for chronic effects for endangered and non endangered fish the following restrictions have to be applied:

1. "Apply only during alternate years to fields adjacent to aquatic areas listed above" (lakes, reservoirs, rivers, permanent streams, marshes or natural ponds, and estuaries)

2. "Do not apply within 100 feet of aquatic areas listed above"

3. "In counties with endangered fish species, do not apply within 150 feet of aquatic areas listed above. Contact your local agricultural extension agent for a list of counties of concern."

4. "Do not cultivate within 10 feet of an aquatic area to allow growth of a vegetative filter strip.".

The EEB is concern with the buffer zones. There are questions on how cultivation cannot be made within 10 feet of an aquatic area and not applying pesticide within 100 feet of an aquatic area. The interpretation of item number 2 is that those areas will be cultivated but no application of pesticide will be done. The interpretation of item number 4 is that 10 of those 100 feet will not be cultivated. Is the 100 feet buffer zone realistic if they are going to cultivate 90 of the 100 feet?

A mitigation measure to reduce the risk to fish is to have three applications instead of four. The level of concern is triggered at the fourth application of tebuconazole. Having three applications will reduce the residue below our level of concern.

The EEB recommend that a refined exposure assessment be conducted. The results of the refined exposure assessment might change the risk assessment.

101.4 Adequacy of Toxicity Data

The data base is complete.

101.5 Adequacy of Labeling

The label should include the following:

1. This pesticide is toxic to estuarine and marine invertebrates. Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high-water mark. Runoff may be hazardous to aquatic organisms in neighboring areas. Do not contaminate water when disposing of equipment washwater or rinsate.

2. Aerial application is prohibited.

Conchi Rodríguez 4/29/94
Biologist
Ecological Effects Branch

Harry Craven
Supervisory Biologist
Ecological Effects Branch

for Anthony F. Maciorowski
Chief
Ecological Effects Branch 4/29/94

APPENDIX 1

Residue expected to be found on different avian food items after application of tebuconazole

Substrate	Residues (ppm)	
	0.2025 lbs ai	0.81 lbs ai
Short Grass	48.6	194.4
Long Grass	22.3	89.1
Leaves and Leafy Crops	25.3	101.3
Forage, alfalfa, clover	11.7	47
Pod Containing Seeds	2.4	9.7
Fruit	1.4	5.7

APPENDIX 2

DAILY ACCUMULATED PESTICIDE RESIDUES---MULTP. APPL.

Chemical name ---------- Tebuconazole
Initial concentration (ppm) ----- 49 (short grass)
Half-life ---------- 191 (photodregadation)
A number of application -------- 5
Application interval ---------- 14
Length of simulation (day) ----- 60

DAY RESIDUE (PPM)

0,49
1,48.8225
2,48.64564
3,48.46943
4,48.29385
5,48.11891
6,47.94459
7,47.77092
8,47.59787
9,47.42544
10,47.25365
11,47.08248
12,46.91192
13,46.74198
14,95.57266
15,95.22646
16,94.8815
17,94.53779
18,94.19534
19,93.85411
20,93.51413
21,93.17539
22,92.83786
23,92.50155
24,92.16647
25,91.83259
26,91.49994
27,91.16849
28,139.8382
29,139.3317
30,138.827
31,138.3241
32,137.823
33,137.3237
34,136.8263
35,136.3306
36,135.8368
37,135.3447
38,134.8544
39,134.3659
40,133.8792
41,133.3942
42,181.911
43,181.252
44,180.5954
45,179.9412
46,179.2894
47,178.6399
48,177.9928
49,177.3481
50,176.7056
51,176.0655
52,175.4277
53,174.7922
54,174.1591
55,173.5282
56,221.8996
57,221.0957
58,220.2948
59,219.4968
60,218.7017
Maximum residue
---------- 221.8996
Average residue
---------- 122.598

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APPENDIX 3

DAILY ACCUMULATED PESTICIDE RESIDUES---MULTP. APPL.

Chemical name ----------	Tebuconazole
Initial concentration (ppm) -----	11.7 (insects/forage)
Half-life ----------	191 (photodegradation)
A number of application --------	4
Application interval ----------	14
Length of simulation (day) -----	55

DAY RESIDUE (PPM)

0,11.7
1,11.65762
2,11.61539
3,11.57331
4,11.53139
5,11.48962
6,11.44799
7,11.40653
8,11.36521
9,11.32403
10,11.28301
11,11.24214
12,11.20142
13,11.16084
14,22.82041
15,22.73774
16,22.65538
17,22.57331
18,22.49154
19,22.41007
20,22.32889
21,22.248
22,22.16741
23,22.08711
24,22.0071
25,21.92738
26,21.84794
27,21.7688
28,33.38995
29,33.26899
30,33.14847
31,33.02839
32,32.90875
33,32.78954
34,32.67076
35,32.55242
36,32.4345
37,32.317
38,32.19993
39,32.08329
40,31.96707
41,31.85127
42,43.43589
43,43.27854
44,43.12177
45,42.96556
46,42.80992
47,42.65484
48,42.50033
49,42.34637
50,42.19297
51,42.04013
52,41.88784
53,41.7361
54,41.58492
55,41.43427
Maximum residue 43.43589
Average residue 27.19053

APPENDIX 4

Formula for the calculation of the small mammals LC50 derived from the rat LD50

LD50 rat (female) = 3933 mg/kg (TOX One Liner)

Species	Body Weight[1]	Food Consumption[1]	Expected Food
Meadow Vole	46 g	28.1 g	grasses
Deer Mouse	13 g	2.1 g	seeds
Least Shrew	5 g	5.5 g	insects

LC50 = LD50 X body weight ÷ daily food consumption

[1]From Davis, D. and F. Golly, 1963. Principles of Mammology. Reinhold Publ. Corp., NY

APPENDIX 5

RUN No. 1 FOR Tebuconazole INPUT VALUES

APPLICATION RATE (LBS/ACRE)	HALF-LIFE (DAYS)	DAYS TO RUNOFF	SOIL KOC
.810	610.0	2.0	1065.0

THE PRELIMINARY EEC VALUE IS 4.9 PPB

RUN No. 2 FOR Tebuconazole INPUT VALUES

APPLICATION RATE (LBS/ACRE)	HALF-LIFE (DAYS)	DAYS TO RUNOFF	SOIL KOC
.203	610.0	2.0	1065.0

THE PRELIMINARY EEC VALUE IS 1.2 PPB

APPENDIX 6

DAILY ACCUMULATED PESTICIDE RESIDUES---MULTP. APPL.

Chemical name ----------	Tebuconazole
Initial concentration (ppb) -----	1.2 (residue in water)
Half-life ----------	610 (aerobic soil metabolism)
A number of application --------	4
Application interval ----------	14
Length of simulation (day) -----	55

DAY RESIDUE (PPB)

0,1.2
1,1.198637
2,1.197276
3,1.195916
4,1.194558
5,1.193202
6,1.191846
7,1.190493
8,1.189141
9,1.187791
10,1.186442
11,1.185094
12,1.183748
13,1.182404
14,2.381061
15,2.378357
16,2.375656
17,2.372958
18,2.370263
19,2.367571
20,2.364883
21,2.362197
22,2.359514
23,2.356835
24,2.354158
25,2.351485
26,2.348814
27,2.346147
28,3.543482
29,3.539458
30,3.535439
31,3.531423
32,3.527413
33,3.523407
34,3.519405
35,3.515409
36,3.511417
37,3.507429
38,3.503445
39,3.499467
40,3.495493
41,3.491523
42,4.687557
43,4.682234
44,4.676917
45,4.671605
46,4.6663
47,4.661001
48,4.655707
49,4.65042
50,4.645139
51,4.639864
52,4.634594
53,4.629331
54,4.624074
55,4.618822

Maximum residue 4.687557
Average residue 2.931326

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APPENDIX 7

RESIDUES FOUND AT THE END OF THE SECOND YEAR

DAILY PESTICIDE RESIDUE--SINGLE APPLICATION

Chemical name ---------- Tebuconazole
Initial concentration (ppb) ----- 4.68 (residue at the time of fourth application)
Half-life ---------- 610 (aerobic soil metabolism)
Length of simulation (day) ----- 720

DAY RESIDUE(PPB)

0,4.68
1,4.674685
2,4.669376
3,4.664073
4,4.658777
5,4.653486
6,4.648201
7,4.642922
8,4.637649
9,4.632383
10,4.627122
11,4.621867
12,4.616618
13,4.611375
14,4.606138
15,4.600907
16,4.595682
17,4.590463
18,4.58525
19,4.580042
20,4.574841
21,4.569646
22,4.564456
23,4.559273
24,4.554095
25,4.548923
26,4.543757
27,4.538596
28,4.533442
29,4.528294
30,4.523151
31,4.518015
32,4.512883
33,4.507758
34,4.502639
35,4.497525
36,4.492418
37,4.487316
38,4.48222
39,4.47713
40,4.472045
41,4.466967
42,4.461893
691,2.134239
692,2.131815
693,2.129394
694,2.126976
695,2.12456
696,2.122147
697,2.119738
698,2.11733
699,2.114926
700,2.112524
701,2.110124
702,2.107728
703,2.105335
704,2.102943
705,2.100555
706,2.09817
707,2.095787
708,2.093407
709,2.091029
710,2.088655
711,2.086283
712,2.083913
713,2.081547
714,2.079183
715,2.076822
716,2.074463
717,2.072107
718,2.069754
719,2.067403
720,2.065055
Maximum residue 4.68
Average residue 3.196448

APPENDIX 8

DAILY ACCUMULATED PESTICIDE RESIDUES---MULTP. APPL.

Chemical name ----------	Tebuconazole
Initial concentration (ppb) -----	3.2[1]
Half-life ----------	610 (aerobic soil metabolism)
A number of application --------	4
Application interval ----------	14
Length of simulation (day) -----	55

DAY RESIDUE (PPB)

0 3.2
1,3.196366
2,3.192736
3,3.18911
4,3.185488
5,3.181871
6,3.178257
7,3.174648
8,3.171042
9,3.167441
10,3.163844
11,3.160251
12,3.156662
13,3.153077
14,6.349497
15,6.342285
16,6.335083
17,6.327889
18,6.320702
19,6.313524
20,6.306354
21,6.299192
22,6.292038
23,6.284892
24,6.277755
25,6.270625
26,6.263504
27,6.256391
28,9.449286
29,9.438555
30,9.427836
31,9.417129
32,9.406433
33,9.395751
34,9.385081
35,9.374423
36,9.363776
37,9.353142
38,9.342521
39,9.33191
40,9.321313
41,9.310727
42,12.50015
43,12.48596
44,12.47178
45,12.45761
46,12.44347
47,12.42933
48,12.41522
49,12.40112
50,12.38704
51,12.37297
52,12.35892
53,12.34488
54,12.33086
55,12.31686
Maximum residue 12.50015
Average residue 7.816868

[1]Residue at the end of the second year (Appendix 6) plus residue of the first application of the third year.

STATE: AR

ENDANGERED/THREATENED SPECIES OCCURRING IN COUNTIES WHERE PEANUTS ARE GROWN

STATE: ARKANSAS	GROUP	STATUS	ACREAGE
COUNTY: CRITTENDEN			
STURGEON, PALLID	FISH	L	1287

STATE: FL

ENDANGERED/THREATENED SPECIES OCCURRING IN COUNTIES WHERE PEANUTS ARE GROWN

STATE: FLORIDA	GROUP	STATUS	ACREAGE
COUNTY: CALHOUN			
STURGEON, GULF	FISH	L	3495
COUNTY: COLUMBIA			
STURGEON, GULF	FISH	L	1688
COUNTY: DIXIE			
STURGEON, GULF	FISH	L	
COUNTY: ESCAMBIA			
STURGEON, GULF	FISH	L	65
COUNTY: GADSDEN			
STURGEON, GULF	FISH	L	518
COUNTY: GILCHRIST			
STURGEON, GULF	FISH	L	417
COUNTY: HAMILTON			
STURGEON, GULF	FISH	L	169
COUNTY: JACKSON			
STURGEON, GULF	FISH	L	33836
COUNTY: JEFFERSON			
STURGEON, GULF	FISH	L	2052
COUNTY: LAFAYETTE			
STURGEON, GULF	FISH	L	73
COUNTY: LEVY			
STURGEON, GULF	FISH	L	3158
COUNTY: OKALOOSA			
DARTER, OKALOOSA	FISH	L	900
STURGEON, GULF	FISH	L	900
COUNTY: SANTA ROSA			
STURGEON, GULF	FISH	L	8918
COUNTY: SUWANNEE			
STURGEON, GULF	FISH	L	3551

STATE: FL

ENDANGERED/THREATENED SPECIES OCCURRING IN COUNTIES WHERE PEANUTS ARE GROWN

STATE: FLORIDA	GROUP	STATUS	ACREAGE
COUNTY: WAKULLA			
STURGEON, GULF	FISH	L	794
COUNTY: WALTON			
DARTER, OKALOOSA	FISH	L	5772
STURGEON, GULF	FISH	L	5772

STATE: GA

ENDANGERED/THREATENED SPECIES OCCURRING IN COUNTIES WHERE PEANUTS ARE GROWN

STATE: GEORGIA	GROUP	STATUS	ACREAGE
COUNTY: APPLING			
STURGEON, SHORTNOSE	FISH	L	92
COUNTY: BRYAN			
STURGEON, SHORTNOSE	FISH	L	304
COUNTY: BURKE			
STURGEON, SHORTNOSE	FISH	L	55
COUNTY: DECATUR			
STURGEON, GULF	FISH	L	18602
COUNTY: EFFINGHAM			
STURGEON, SHORTNOSE	FISH	L	384
COUNTY: JEFF DAVIS			
STURGEON, SHORTNOSE	FISH	L	172
COUNTY: MCINTOSH			
STURGEON, SHORTNOSE	FISH	L	2455
COUNTY: MONTGOMERY			
STURGEON, SHORTNOSE	FISH	L	900
COUNTY: RICHMOND			
STURGEON, SHORTNOSE	FISH	L	198
COUNTY: SCREVEN			
STURGEON, SHORTNOSE	FISH	L	7005
COUNTY: SEMINOLE			
STURGEON, GULF	FISH	L	17433
COUNTY: TATTNALL			
STURGEON, SHORTNOSE	FISH	L	1303
COUNTY: TELFAIR			
STURGEON, SHORTNOSE	FISH	L	4834
COUNTY: TOOMBS			
STURGEON, SHORTNOSE	FISH	L	1574
COUNTY: WHEELER			
STURGEON, SHORTNOSE	FISH	L	1118

STATE: MS

ENDANGERED/THREATENED SPECIES OCCURRING IN COUNTIES WHERE PEANUTS ARE GROWN

STATE: MISSISSIPPI	GROUP	STATUS	ACREAGE
COUNTY: COPIAH			
DARTER, BAYOU	FISH	L	31
COUNTY: HINDS			
DARTER, BAYOU	FISH	L	23
STURGEON, GULF	FISH	L	23
COUNTY: JEFFERSON			
STURGEON, PALLID	FISH	L	10

STATE: SC

ENDANGERED/THREATENED SPECIES OCCURRING IN COUNTIES WHERE PEANUTS ARE GROWN

STATE: SOUTH CAROLINA	**GROUP**	**STATUS**	**ACREAGE**
COUNTY: ALLENDALE			
STURGEON, SHORTNOSE	FISH	L	1039
COUNTY: COLLETON			
STURGEON, SHORTNOSE	FISH	L	21
COUNTY: FLORENCE			
STURGEON, SHORTNOSE	FISH	L	76
COUNTY: HAMPTON			
STURGEON, SHORTNOSE	FISH	L	935
COUNTY: ORANGEBURG			
STURGEON, SHORTNOSE	FISH	L	142

STATE: NC

ENDANGERED/THREATENED SPECIES OCCURRING IN COUNTIES WHERE PEANUTS ARE GROWN

STATE: NORTH CAROLINA	GROUP	STATUS	ACREAGE
COUNTY: BRUNSWICK			
STURGEON, SHORTNOSE	FISH	L	55
COUNTY: CHOWAN			
STURGEON, SHORTNOSE	FISH	L	5170
COUNTY: COLUMBUS			
SILVERSIDE, WACCAMAW	FISH	L	1005
COUNTY: CRAVEN			
STURGEON, SHORTNOSE	FISH	L	53
COUNTY: MARTIN			
STURGEON, SHORTNOSE	FISH	L	16286
COUNTY: MOORE			
SHINER, CAPE FEAR	FISH	L	67
COUNTY: NEW HANOVER			
STURGEON, SHORTNOSE	FISH	L	31
COUNTY: ONSLOW			
STURGEON, SHORTNOSE	FISH	L	24
JNTY: PASQUOTANK			
STURGEON, SHORTNOSE	FISH	L	80
COUNTY: PENDER			
STURGEON, SHORTNOSE	FISH	L	508
COUNTY: PERQUIMANS			
STURGEON, SHORTNOSE	FISH	L	2498
COUNTY: RICHMOND			
STURGEON, SHORTNOSE	FISH	L	85
COUNTY: TYRRELL			
STURGEON, SHORTNOSE	FISH	L	111
COUNTY: WASHINGTON			
STURGEON, SHORTNOSE	FISH	L	2757

STATE: VA

ENDANGERED/THREATENED SPECIES OCCURRING IN COUNTIES WHERE PEANUTS ARE GROWN

STATE: VIRGINIA	GROUP	STATUS	ACREAGE
COUNTY: DINWIDDIE			
LOGPERCH, ROANOKE	FISH	P	2832
COUNTY: GREENSVILLE			
LOGPERCH, ROANOKE	FISH	P	9961
COUNTY: SUSSEX			
LOGPERCH, ROANOKE	FISH	P	119(