Appendix E1. T-REX

T-REX Version 1.3.1
July 7, 2007

This spreadsheet was developed by the Terrestrial Biology and Exposure Technical Teams.
For information or questions concerning this spreadsheet, please contact the Terrestrial Exposure Technical Team Co-Chairs.

New Version Notes

7/18/2005, v. 1.2.2. Mineau scaling factors for birds **MUST** be manually entered in the Inputs worksheet. While the EFED default value is 1.15 it **MUST** also be entered if that default is desired. If no value is provided, the model will exhibit warning statements in all outputs. If the user desires to have no scaling performed, 0 may be entered in the Inputs worksheet.
Body weights for Mallard duck and Bobwhite quail were adjusted (Dunning, 1984).
User can opt for test species for acute and chronic endpoints other than mallard and bobwhite (test animal body weight data must be provided)
User can opt for alternative bodyweights from defaults for endpoints established with bobwhite and mallard
The LD50 ft-2 data input section in the Inputs worksheet was reorganized to be more user-friendly.
LD50 ft-2 can now be calculated for a liquid broadcast application.
All references are available in the seed treatment worksheet. These references are also hyperlinked.
Maximum seeding rate information is now in blue and can be adjusted by the user.

8/1/2005, v. 1.2.3. A comment sheet has been added so that EFED users can provide feedback or pose questions to the Terrestrial Biology and Exposure Technical Teams This feature is available to EFED users only.

12/7/2006, v. 1.3.1. A new sheet "Print Results" was added to facilitate cutting and pasting into MS Word documents. For transparency, the results summary tables include toxicity and exposure values used in the RQ calculations.
Use of FDA's assumption that a lab rat consumes 5% of its diet daily was made optional for mammalian chronic studies. If a study reports both a NOAEC in ppm and a NOAEL in mg/kg-bw, both may be entered.
The % a.i. cell was formatted to percent. The calculations of application rate (lbs a.i./Acre) in the upper bound Kenaga and the mean Kenaga sheets no longer reference a hidden cell that calculates the application rate in terms of % a.i., but is calculated in the "application rate" cell.
Additional calculations were included to allow for additional characterization of the LD50-ft2. A new sheet "Granular Characterization Calcs" estimates the number of granules needed to be consumed by a bird to achieve a dose that would trigger a level of concern. The associated minimum foraging area with sufficient number of granules to achieve a dose that exceeds the AdjLD50 or 1/10th the AdjLD50 is also estimated for various assumptions of feeding efficiency (10%, 50%, or 100% of granules in an area are consumed).

7/7/2007 v. 1.3.1. For clarification, percent a.i. was made a user input in the Granular Characterization Calcs sheet instead of importing the value from the Inputs sheet. No other changes were made to the spreadsheet.

Supporting Documentation
For further model information consult the 'User's Guide' document containing T-REX operating instructions and background information. User's Guide TREX v1.3.1, December 2006, USEPA Office of Pesticide Programs, Washington DC

References

Dunning, J.B. 1984. Body weights of 686 species of North American birds. Western Bird Banding Assoc. Monograph No. 1.
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Urban, D. J. 2000. Guidance for Conducting Screening Level Avian Risk Assessments for Spray Applications of Pesticides. OPP/EFED, USEPA.
USEPA. 1993. Wildlife Exposure Factors Handbook. Volume I of II. EPA/600/R-93/187a. Office of Research and Development, Washington, D. C. 20460.
USEPA. 1995. Great Lakes Water Quality Technical Support Document for Wildlife Criteria. Office of Water, Washington D.C. Document Number EPA-820-B095-009
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TREX Output

Artichokes

Upper Bound Kenaga Residues For RQ Calculation

Chemical Name:	Propyzamide
Use	Artichoke
Formulation	Propyzamide
Application Rate	4.08 lbs a.i./acre
Half-life	35 days
Application Interval	120 days
Maximum # Apps./Year	2
Length of Simulation	1 year

Acute and Chronic RQs are based on the Upper Bound Kenaga Residues.

The maximum single day residue estimation is used for both the acute and reproduction RQs.

RQs reported as "0.00" in the RQ tables below should be noted as <0.01 in your assessment. This is due to rounding and significant figure issues in Excel.

Endpoints			
Avian	Bobwhite quail	LD50 (mg/kg-bw)	8870.00
	Bobwhite quail	LC50 (mg/kg-diet)	10000.00
	Bobwhite quail	NOAEL(mg/kg-bw)	20.00
	Bobwhite quail	NOAEC (mg/kg-diet)	267.00
Mammals		LD50 (mg/kg-bw)	5620.00
		LC50 (mg/kg-diet)	0.00
		NOAEL (mg/kg-bw)	15.00
		NOAEC (mg/kg-diet)	200.00

Dietary-based EECs (ppm)	Kenaga Values
Short Grass	1070.14
Tall Grass	490.48
Broadleaf plants/sm Insects	601.96
Fruits/pods/seeds/lg insects	66.88

Avian Results

Avian Class	Body Weight (g)	Ingestion (Fdry) (g bw/day)	Ingestion (Fwet) (g/day)	% body wgt consumed	FI (kg-diet/day)
Small	20	5	23	114	2.28E-02
Mid	100	13	65	65	6.49E-02
Large	1000	58	291	29	2.91E-01

Avian Body Weight (g)	Adjusted LD50 (mg/kg-bw)
20	6390.21
100	8135.06
1000	11491.07

Dose-based EECs (mg/kg-bw)	Avian Classes and Body Weights		
	small 20 g	mid 100 g	large 1000 g
Short Grass	1218.79	695.00	311.16
Tall Grass	558.61	318.54	142.62
Broadleaf plants/sm Insects	685.57	390.94	175.03
Fruits/pods/seeds/lg insects	76.17	43.44	19.45

Dose-based RQs (Dose-based EEC/adjusted LD50)	Avian Acute RQs		
	20 g	100 g	1000 g
Short Grass	0.19	0.09	0.03
Tall Grass	0.09	0.04	0.01
Broadleaf plants/sm insects	0.11	0.05	0.02
Fruits/pods/seeds/lg insects	0.01	0.01	0.00

Dietary-based RQs (Dietary-based EEC/LC50 or NOAEC)	RQs	
	Acute	Chronic
Short Grass	0.11	4.01
Tall Grass	0.05	1.84
Broadleaf plants/sm Insects	0.06	2.25
Fruits/pods/seeds/lg insects	0.01	0.25

Note: To provide risk management with the maximum possible information, it is recommended that both the dose-based and concentration-based RQs be calculated when data are available

Mammalian Results

Mammalian Class	Body Weight	Ingestion (Fdry) (g bwt/day)	Ingestion (Fwet) (g/day)	% body wgt consumed	FI (kg-diet/day)
Herbivores/ insectivores	15	3	14	95	1.43E-02
	35	5	23	66	2.31E-02
	1000	31	153	15	1.53E-01
Grainvores	15	3	3	21	3.18E-03
	35	5	5	15	5.13E-03
	1000	31	34	3	3.40E-02

Mammalian Class	Body Weight	Adjusted LD50	Adjusted NOAEL
Herbivores/ insectivores	15	12351.81	32.97
	35	9993.93	26.67
	1000	4322.68	11.54
Grainvores	15	12351.81	32.97
	35	9993.93	26.67
	1000	4322.68	11.54

Dose-Based EECs (mg/kg-bw)	Mammalian Classes and Body weight					
	Herbivores/ insectivores			Granivores		
	15 g	35 g	1000 g	15 g	35 g	1000 g
Short Grass	1020.30	705.16	163.49			
Tall Grass	467.64	323.20	74.94			
Broadleaf plants/sm Insects	573.92	396.65	91.97			
Fruits/pods/seeds/lg insects	63.77	44.07	10.22	14.17	9.79	2.27

Dose-based RQs (Dose-based EEC/LD50 or NOAEL)	15 g mammal		35 g mammal		1000 g mammal	
	Acute	Chronic	Acute	Chronic	Acute	Chronic
Short Grass	0.08	30.95	0.07	26.44	0.04	14.17
Tall Grass	0.04	14.18	0.03	12.12	0.02	6.49
Broadleaf plants/sm insects	0.05	17.41	0.04	14.87	0.02	7.97
Fruits/pods/lg insects	0.01	1.93	0.00	1.65	0.00	0.89
Seeds (granivore)	0.00	0.43	0.00	0.37	0.00	0.20

Dietary-based RQs (Dietary-based EEC/LC50 or NOAEC)	Mammal RQs	
	Acute	Chronic
Short Grass	#DIV/0!	5.35
Tall Grass	#DIV/0!	2.45
Broadleaf plants/sm insects	#DIV/0!	3.01
Fruits/pods/seeds/lg insects	#DIV/0!	0.33

Note: To provide risk management with the maximum possible information, it is recommended that both the dose-based and concentration-based RQs be calculated when data are available