An Avian Ecological Risk Assessment For Chlorfenapyr In Cotton: MRID No. 44477901

ERRATA

Typographical Error:

The table on page 80 in *The Risk Assessment* contained a typographical error in the footnote indicating a NOEL at 500 ppm instead of 500 ppb. This error has been corrected in the footnote to the table below.

> *Even under the extremely conservative assumptions that 100% of the avian diet, over several consecutive days will be treated soil bearing 500 ppb of chlorfenapyr, the extremely low bioavailable concentration in soil (0.5 ppb), significantly mitigates any potential for the reproductive NOEL (500 ppb) for the most sensitive species, to be exceeded.

Calculation Errors affecting RQs for Acute Oral Exposure Only:

There were two inadvertent minor calculation errors which affected the column for Total mg/kg/day in the tables on pages 88-95 of the Avian Ecological Risk Assessment. For example, for Scenario 1 on page 88, the total daily ingestion values for the Northern Cardinal should read 1.987, 1.072, and 0.157 mg/kg/day for the high, moderate and low exposure levels respectively, instead of the reported values, i.e., 1.128, 0.617, and 0.107. These differences are due to the two inadvertent errors which affect only the calculation of Total mg/kg/day and do not affect the calculation of ppm in the diet. Hence all RQ's for Acute Dietary Exposure and Chronic Exposures are unaffected. These errors are:

- In converting seed caloric values from dry weight to wet weight, Cyanamid divided by 1 minus the water content, instead of multiplying by 1 minus the water content. However, this error had a marginal affect on the overall Acute Oral Exposure RQs because the percentage of water in seeds is low (0.093); thus the resulting difference in the metabolizable energy of seeds (4.6 kcal/g instead of 5.6 kcal/g) had a minimal impact on the calculation of the wet weights of the seeds consumed. Moreover, this error only impacted RQ calculations for those species where seeds are a significant proportion of the diet (the Mourning Dove, the Blue Grosbeak, the Red-winged Blackbird and the Northern Cardinal).

- A second inadvertent error was in the spreadsheet used to produce the tables on pages 88 through 95 of the Ecological Risk Assessment. This error was a double adjustment for percent seed, fruit or insect in the diet.

These errors only affected the RQ's for Acute Oral Exposure.

Due to uncertainty as to the relative sensitivity of the Mourning Dove, a more conservative approach was adopted. The response profile for the Mourning Dove is now based on the acute toxicity values for the Red-winged Blackbird (acute oral of 2.2 mg/kg and acute dietary of 11.3 ppm) and the chronic toxicity value for the Mallard (0.5 ppm), rather than the acute and chronic toxicity values for the Bobwhite Quail.

It can be seen that the RQ's and hence the conclusions of the Ecological Risk Assessment for Acute Dietary and Chronic exposure are unchanged. The RQ's for Acute Oral exposure increased slightly, which resulted in more species exceeding levels of concern in the high and moderate exposure levels. It should be noted that, except the Mourning Dove, with an acute Oral RQ of 0.513 for Scenario 2, all species were still below levels of concern if residues were allowed to degrade for 10 days after application.

The corrected RQ's are provided below in replacements for the Tables 10 and 11 on pages 103 and 104, respectively, of the Ecological Risk Assessment.

Overview of Acute and Chronic Risk Quotients, Southern Cotton

Scenario	Type of Effect	RQ Range	EPA Level of Concern	Species with RQs Exceeding the Level of Concern and Their RQs
1 - Late season, time 0 residues	Acute oral	<0.001-1.292	0.5	Carolina Wren - High Exposure: 1.184 White-eyed Vireo - High Exposure: 1.292 Northern Cardinal - High Exposure: 0.901 Blue Grosbeak - High Exposure: 1.239 Red-winged Blackbird - High Exposure: 1.078 Mourning Dove - High Exposure: 1.028 Carolina Wren - Mod. Exposure: 0.654 White-eyed Vireo - Mod. Exposure: 0.716 Blue Grosbeak - Mod. Exposure: 0.657 Red-winged Blackbird - Mod. Exposure: 0.569 Mourning Dove - Mod. Exposure: 0.519
1 - Late season, time 0 residues	Acute dietary	<0.001-1.434	0.5	Blue Grosbeak - High Exposure: 0.798 Mourning Dove - High Exposure: 1.434 Red-winged Blackbird - High Exposure: 0.852 Mourning Dove - Moderate Exposure: 0.723
1 - Late season, time 0 residues	Chronic	0.25-32.42	1.0	All 6 Species - High Exposure: 7.57 to 32.42 All 6 Species - Moderate Exposure: 4.16 to 16.33
2 - Late season, residues after 10 days	Acute oral	<0.001-0.513	0.5	Mourning Dove - High Exposure: 0.513
2 - Late season, residues after 10 days	Acute dietary	<0.001-0.718	0.5	Mourning Dove - High Exposure: 0.718
2 - Late season, residues after 10 days	Chronic	0.01-16.24	1.0	Northern Cardinal - High Exposure: 2.45 Blue Grosbeak - High Exposure: 6.56 Mourning Dove - High Exposure: 16.24 Red-winged Blackbird - High Exposure: 7.38 Northern Cardinal - Moderate Exposure: 1.24 Blue Grosbeak - Moderate Exposure: 3.30 Mourning Dove - Moderate Exposure: 8.18 Red-winged Blackbird - Moderate Exposure: 3.72

Overview of Acute and Chronic Risk Quotients, Western Cotton.

Scenario	Type of Effect	RQ Range	EPA Level of Concern	Species with RQs Exceeding the Level of Concern and Their RQs
3 - Early season (mites), time 0 residues	Acute oral	<0.001-0.679	0.5	Carolina Wren - High Exposure: 0.615 White-eyed Vireo - High Exposure: 0.679 Blue Grosbeak - High Exposure 0.521
3 - Early season (mites), time 0 residues	Acute dietary	0.005-0.431	0.5	None
3 - Early season (mites), time 0 residues	Chronic	0.10-9.75	1.0	All 6 Species - High Exposure: 3.92 to 9.75 All 6 Species - Moderate Exposure: 2.16 to 4.92
4 - Early season (mites), residues after 10 days	Acute oral	<0.001-0.073	0.5	None
4 - Early season (mites), residues after 10 days	Acute dietary	<0.001-0.219	0.5	None
4 - Early season (mites), residues after 10 days	Chronic	0.01-4.95	1.0	Blue Grosbeak - High Exposure: 2.00 Mourning Dove - High Exposure: 4.95 Red-winged Blackbird - High Exposure: 2.25 Blue Grosbeak - Moderate Exposure: 1.01 Mourning Dove - Moderate Exposure: 2.50 Red-winged Blackbird - Moderate Exposure: 1.14

Acute Oral Toxicity Calculations: Sample calculations

The total amount of each food type (seed, insect or fruit) was calculated based upon the body weight of the species, the metabolizable energy (kcal/g wet weight) contained in each food type and field metabolic rate. The body weights used were presented in the Ecological Risk Assessment for chlorfenapyr (Table 3, pp. 45 - 46). The metabolizable energy for insects and fruits (wet weight) were available directly from EPA's Wildlife Exposure Factors Handbook (Tables 4 - 1 and 4 - 2, respectively). For insects, an average value from grasshoppers, crickets, and adult beetles was used, and for fruit, the value for pulp and skin was used. The value including seeds along with the pulp and skin was not used, because it has been generally observed that the seeds appear in the birds' droppings after consuming fruit. For seeds, no wet weight metabolizable energy values were available, so the dry weight metabolizable energy value from Table 4-2 of EPA's Wildlife Exposure Factors Handbook was adjusted to wet weight by multiplying the dry weight metabolizable energy by (1-% water). To derive the total daily intake, the allometric equations developed by Nagy (1987) as reported in EPA's Wildlife Exposure Factors Handbook were used. Taking the Northern Cardinal in Scenario 1 as an example:

Diet Component	Proportion Of Diet	Body Weight (g)	Metabolizable Energy kcal/g Dry Wt	% Water	Metabolizable Energy kcal/g Wet Wt	Field Metabolic Rate (kcal/day)	Grams Consumed Wet Wt.
seed	0.145	44.6	5.1	0.093	4.6	36.5	1.15
insect	0.71	44.6			1.6	36.5	16.197
fruit	0.145	44.6			1.1	36.5	4.811
seed	0.145	44.6	5.1	0.093	4.6	36.5	1.15
insect	0.71	44.6			1.6	36.5	16.197
fruit	0.145	44.6			1.1	36.5	4.811
seed	0.145	44.6	5.1	0.093	4.6	36.5	1.15
insect	0.71	44.6			1.6	36.5	16.197
fruit	0.145	44.6			1.1	36.5	4.811

(The values for all 3 Exposure Levels, High, Moderate, and Low are included for completeness.)

The following equations were used to arrive at each calculated value in the above table. It should be noted that % Water is actually a proportion in the above table.

Metabolizable Energy kcal/g wet wt. (seed only) = Metabolizable Energy kcal/g Dry Wt. * (1 - % water). This would be 5.1 * (1.000-0.093) which is 4.627, rounded to 4.6 in the Table.

Field Metabolic Rate = 2.123 * (Body Weight (g))$^{0.749}$. For example 2.123 * (44.6)$^{0.749}$ which is 36.5 kcal/day.

Grams consumed = (Proportion Of Diet * Field Metabolic Rate (kcal/day)) ÷ Metabolizable Energy kcal/g Wet Wt).

For example, for seed, (0.145 * 36.5) ÷ (4.6) which is 1.15 grams Wet Wt. (differences at the 3rd decimal place are due to the calculations being made at more than 3 figures in the Excel Spreadsheet, but all values being reported to only 3 figures in the Table).

Thus, although seed and fruit were both considered to be 14.5% (a proportion of 0.145) of the Northern Cardinal diet, the amounts consumed, measured in grams, were different because the metabolizable energy in seeds and fruit is different.

To arrive at the total amount of chlorfenapyr that would potentially be consumed, the following information was used. Again, using the Northern Cardinal and the Low Exposure Level as an example.

Exposure Level	Diet Component	Body Weight (g)	Unadj. Dietary Conc. (ppm)	Grams Consumed Wet Wt.	mg a.i./kg body weight/day	Total mg/kg/day
High	seed	44.6	16.330	1.15	0.426	
	insect	44.6	4.150	16.197	1.507	
	fruit	44.6	0.500	4.811	0.054	1.987
Moderate	seed	44.6	8.225	1.15	0.214	
	insect	44.6	2.280	16.197	0.828	
	fruit	44.6	0.275	4.811	0.030	1.072
Low	seed	44.6	0.120	1.15	0.003	
	insect	44.6	0.410	16.197	0.149	
	fruit	44.6	0.050	4.811	0.005	0.157

The following equations were used to arrive at each calculated value in the above table.

mg a.i./kg body weight/day = (Grams Consumed Wet Wt. * Unadj. Dietary Conc. in mg/g) ÷ Body Weight (kg)
For example, for seed in the Low Exposure Level (1.15 g * 0.000120 mg/g) ÷ 0.044 kg which is 0.0031 or, rounding, 0.003 mg/kg /day.

Total mg /kg/day = mg a.i./kg body weight/day for seed + mg a.i./kg body weight/day for insect + mg a.i./kg body weight/day for fruit
For example, for the Low Exposure Level (0.003 + 0.149 + 0.005) which is 0.158 mg/kg/day (differences at the 3rd decimal place are due to the calculations being made at more than 3 figures in the Excel Spreadsheet, but all values being reported to only 3 figures in the Table).

The total of daily ingestion values, e.g., 1.987, 1.072, and 0.157 mg/kg/day, can be compared to the LD_{50} value expressed as mg/kg.