United States
Environmental Protection Agency
Office of Prevention, Pesticides and Toxic Substances
(7505P)

Pesticide Fact Sheet

Name of Chemical: **Chlorantraniliprole**
Reason for Issuance: **Unconditional Registration**
Date Issued: **April 2008**

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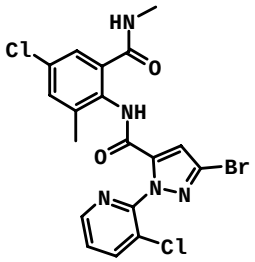
1. DESCRIPTION OF CHEMICAL

Chemical Name:	3-Bromo-*N*-[4-chloro-2-methyl-6-(methylcarbamoyl)phenyl]-1-(3-chloro-2-pyridine-2-yl)-1H-pyrazole-5-carboxamide
Empirical Formula	$C_{18}H_{14}N_5O_2BrCl_2$
Common Name:	Chlorantraniliprole
Experimental Name:	DPX-E2Y45
EPA PC Code:	090100

Chemical Class:	Anthranilic diamide insecticide
Mode of Action:	Interruption of normal muscle contraction
Pesticide Type:	Insecticide
U.S. Technical Registrant:	DuPont Crop Protection P.O. Box 30 Newark, DE 19714-0030
Chemical Structure:	

2. USE PATTERNS AND FORMULATIONS

Registered Uses:	pome fruit (crop group 11), stone fruit (crop group 12), leafy vegetables (crop group 4), *Brassica* leafy vegetables (crop group 5), cucurbit vegetables (crop group 9), fruiting vegetables (crop group 8), cotton, grapes, potatoes, rice, and ornamentals and turf grass growing in residential, commercial, and public landscaped areas
Pests/Application Sites:	moths, beetles, caterpillars, etc.
Application Rates:	Seasonal Maximum: Food Crops- 0.2 lb a.i./acre (rice- 0.13 a.i./acre/year) Turf Grass- 0.5 lb a.i./acre Ornamentals- highly variable, range between 0.33 to 0.5 lb a.i./acre
Types of Formulations/ Product Names:	Technical: DuPont Rynaxypyr Technical (95.3% a.i.) End Use (Agricultural Uses): DuPont Coragen (18.4% a.i.; suspension concentrate)

DuPont Altacor
(35% a.i.; water dispersible granule)

End Use (Turf and Ornamental Uses):
DuPont E2Y45 SC Insecticide
(18.4% a.i.; suspension concentrate)
DuPont E2Y45 0.33G Insecticide
(0.33% a.i.; granular)
DuPont E2Y45 0.16G Insecticide
(0.16% a.i.; granular)
DuPont E2Y45 0.133G Insecticide + Fertilizer
(0.133% a.i.; granular)

Manufacturing Concentrate (35% a.i.)

3. SCIENCE FINDINGS

Physical and Chemical Characteristics:

Available product chemistry data supporting the use of chlorantraniliprole are summarized below in Tables 1 and 1.1.

Table 1. Chlorantraniliprole Nomenclature.

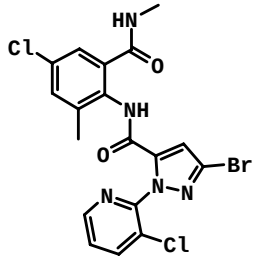
Chemical structure	
Common name	Chlorantraniliprole
Company experimental name	DPX-E2Y45
IUPAC name	3-Bromo-*N*-[4-chloro-2-methyl-6-(methylcarbamoyl)phenyl]-1-(3-chloro-2-pyridine-2-yl)-1H-pyrazole-5-carboxamide
CAS name	3-Bromo-*N*-[4-chloro-2-methyl-6-[(methylamino)carbonyl]phenyl]-1-(3-chloro-2-pyridinyl)-1H-pyrazole-5-carboxamide
CAS registry number	500008-45-7

Table 1.1. Physiochemical Properties of the Technical Grade Test Compound

Parameter	Value
Melting point/range (°C)	200-202 (95.9%)/208 – 210 (99.2%)
pH	5.77 ± 0.087 at 20°C
Relative Density	1.5189 (95.9%)/1.507 (99.2%) at 20°C

Table 1.1. Physiochemical Properties of the Technical Grade Test Compound

Parameter	Value
Water solubility (20°C)	Deionized Water 1.023 mg/L pH 4 0.972 mg/L pH 7 0.880 mg/L pH 9 0.971 mg/L
Solvent solubility (20°C)	Acetone 3.446 ± 0.172 g/L Acetonitrile 0.711 ± 0.072 g/L Ethyl Acetate 1.144 ± 0.046 g/L Dichloromethane 2.476 ± 0.058 g/L Dimethylformamide 124 ± 4 g/L n-Octanol 0.386 ± 0.01 g/L Methanol 1.714 ± 0.057 g/L n-Hexane <0.0001 g/L o-Xylene 0.162 ± 0.01 g/L
Vapor pressure	6.3 x 10^{-12} Pa @ 20°C, 2.1 x 10^{-11} Pa @ 25°C
Dissociation constant, pK_a	10.88 ± 0.71
Octanol/water partition coefficient, K_{OW} (20°C)	Deionized Water 589 pH 4 588 pH 7 721 pH 9 654
UV/visible absorption (max)	pH <2 no absorption max >200 nm, at 290 ε = 3941 pH 7 no absorption max >200 nm, at 290 ε = 4185 pH >10 absorption max at ~320 nm which may be due to decomposition of DPX-E2Y45, at 290 ε = 6082

Metabolism Assessment:

The nature of the residue in plants and livestock is adequately understood. Very little degradation was observed in primary and rotational crops. Unchanged parent chlorantraniliprole was the major identified residue in primary and rotational crops. The metabolism of chlorantraniliprole in livestock was extensive and followed the major steps similar to those observed in rice: (i) hydroxylation of the N-methyl group (to IN-H2H20) or hydroxylation of the tolyl methyl group (to IN-HXH44); (ii) cyclization with loss of water to a quinazolinone derivative (IN-EQW78); and (iii) N-demethylation via IN-H2H20 to IN-F9N04.

Hazard Characterization:

Toxicology Requirements-

The toxicology requirements (40 CFR 158.340) for a food use for chlorantraniliprole are in Table 2.

Table 2. Toxicology Data Requirements

Test	Technical	
	Required	**Satisfied**
870.1100 Acute Oral Toxicity	yes	yes
870.1200 Acute Dermal Toxicity	yes	yes
870.1300 Acute Inhalation Toxicity	yes	yes
870.2400 Primary Eye Irritation	yes	yes
870.2500 Primary Dermal Irritation	yes	yes
870.2600 Dermal Sensitization	yes	yes
870.3100 Oral Subchronic (rodent)	yes	yes
870.3150 Oral Subchronic (nonrodent)	yes	yes
870.3200 21-Day Dermal	yes	yes
870.3250 90-Day Dermal	no	-
870.3465 90-Day Inhalation	no	-
870.3700a Developmental Toxicity (rodent)	yes	yes
870.3700b Developmental Toxicity (nonrodent)	yes	yes
870.3800 Reproduction	yes	yes
870.4100a Chronic Toxicity (rodent)	yes	yes
870.4100b Chronic Toxicity (nonrodent)	yes	yes
870.4200a Oncogenicity (rat)	yes	yes
870.4200b Oncogenicity (mouse)	yes	yes
870.4300 Chronic/Oncogenicity	yes	yes
870.5100 Mutagenicity—Gene Mutation - bacterial	yes	yes
870.5300 Mutagenicity—Gene Mutation - mammalian	yes	yes
870.5385 Mutagenicity—Structural Chromosomal Aberrations	yes	yes
870.5395 Mutagenicity—Micronucleus	yes	yes
870.6100a Acute Delayed Neurotox. (hen)	no	-
870.6100b 90-Day Neurotoxicity (hen)	no	-
870.6200a Acute Neurotox. Screening Battery (rat)	yes	yes
870.6200b 90-Day Neuro. Screening Battery (rat)	yes	yes
870.6300 Develop. Neuro	no	-
870.7485 General Metabolism	yes	yes
870.7600 Dermal Penetration	no	-
Special Studies		
28-day immunotoxicity (rat)		yes
28-day immunotoxicity (mouse)		yes

Acute Toxicity-

Chlorantraniliprole Technical is toxicity category IV for all routes of exposure and is a non-sensitizer (Table 3).

Table 3. Acute Toxicity of Technical Chlorantraniliprole

Guideline No.	Study Type	MRID No.	Results	Toxicity Category
870.1100	Acute oral toxicity	46889112	LD50 = >5000 mg/kg bw	IV
870.1200	Acute dermal toxicity	46889113	LD50 = >5000 mg/kg bw	IV
870.1300	Acute inhalation toxicity	46889121	LC50 = >5.1 mg/L	IV

870.2400	Acute eye irritation	46889115	Iritis score of 1 in 1/3 rabbits, conjuctival redness score of 1 in 2/3 rabbits. All eyes returned to normal after 72 hours.	IV
870.2500	Primary skin irritation	46889114	No dermal irritation, clinical signs or body weight loss	IV
870.2600	Dermal sensitization	46889221	Not a dermal sensitizer	Negative

Subchronic, Chronic and Other Toxicity-

In short-term studies, the most consistent effects are those associated with non adverse pharmacological response to the xenobiotic, induction of liver enzymes and subsequent increase in liver weights. Chlorantraniliprole is not genotoxic, neurotoxic, immunotoxic, carcinogenic, or teratogenic. Overall, chlorantraniliprole exhibits minimal mammalian toxicity after long-term exposure. The only consistent observation in the mammalian toxicology studies is an increased degree of microvesiculation of the adrenal cortex after dermal or dietary administration of chlorantraniliprole. Based on the lack of adverse effect on the function of the adrenal gland, this observation was considered treatment related, but not "adverse."

Table 4. Subchronic, Chronic and Other Toxicity Profile

STUDY/ SPECIES	DOSES (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	EFFECTS
14-day Oral Gavage/ rat	0, 25, 100, 1000	1000	Not established	No adverse effects. Weak inducer of cytochrome P450 3A at all dose levels, with statistical significance at 100 and 1000 mg/kg/day.
28-Day Oral (feed)/rat	0, 20.7, 106 and 584 (male); 0, 24, 128 and 675 (female)	584 (male) and 675 (female)	Not established	No adverse effects. Slight increase in liver weight at 128 and 675 mg/kg/day in females and minimal hepatocellular hypertrophy at 675 mg/kg that is attributed to enzyme induction characterized by increased amount of eosinophilic cytoplasm with hepatocytes but no histomorphologic evidence of hepatocellular damage. In 128 and 675 mg/kg females, a statistically significant increase in UDP-GT activity was observed in HDT female rats, with a similar increase in males. These changes are consistent with a pharmacological response and were not considered adverse.
28-Day Oral (feed)/mouse	0, 52, 182, 538 and 1443 (male); 0, 64, 206, 658 and 1524 (female)	1443 (male) and 1524 (female)	Not established	No adverse effects. Slight increase in liver wt. in 658 and 1524 mg/kg/day females corresponded with a mild increase in cytochrome P450 enzyme activity. No histopathological evidence of liver toxicity was observed. A reduction in body weight gain was observed in HDT males (52%) but not in females. No statistically significant decrease in absolute body weight was observed therefore, this effect was not considered adverse.
28-day Oral (capsule)/ Dog	0, 300, 1000	1000	Not established	No adverse effects. Induction of cytochrome P450 enzyme activity (58%) in both males and females at 1000 mg/kg/day, specifically 1A1 and 2B1/2 at 300 and 1000 mg/kg/day.
28-day Oral (feed)/dog – Palatability study	0, 26, 138, 266, 797 and 1302 (male); 0, 28, 138, 298, 888, and 1240 (female)	1302 (male) and 1240 (female)	Not established	No adverse effects. Food consumption generally increased as the study progressed with males generally demonstrating the highest food consumption when fed the HDT.
28-day	0, 100, 300 and	1000	Not	No adverse effects. Reductions in mean body

Table 4. Subchronic, Chronic and Other Toxicity Profile

STUDY/ SPECIES	DOSES (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	EFFECTS
Dermal/rat	1000		established	weight gain (22% and 19% for males and females) and food efficiency (19% and 17% for males and females) over the 28-day at the HDT. Increased microvesiculation of adrenal cortex in males only, with no light or electronic microscopic evidence of adrenal cellular degeneration or toxicity. No effect on the capacity of the adrenal gland to produce corticosterone under either basal or following ACTH stimulation. Therefore, these effects were not considered adverse.
90-day Oral (feed)/rat	0, 36.9, 120, 359, 1188 (male); 0, 47, 157, 460, 1526 (female)	1188 (male) and 1526 (female)	Not established	No adverse effects. A slight increase in liver weight at HDT females and reduction in bilirubin in females at ≥157 mg/kg/day, with no corresponding histopathological evidence of liver toxicity.
90-day Oral (feed)/mouse	0, 32.6, 115, 345, 1135 (male); 0, 40.7, 158, 422, 1529 (female)	1135 (male) and 1529 (female)	Not established	No adverse effects. Hyperactivity and hyperreactivity in females were observed near the end of the study and one male in the upper mid dose had convulsions, but these effects were considered spurious as they were not reproducible in the 18-month mouse study with a FOB. A slight increase in liver weight at the HDT males and females, with no corresponding histopathological evidence of liver toxicity.
90-day Oral (feed)/dog	0, 32.2, 119, 303, 1163 (male); 0, 36.5, 133, 318, 1220 (female)	1163 (male) and 1220 (female)	Not established	No adverse effects. A mild increase in liver weight was observed in males at 1163 mg/kg/day, with no corresponding histopathological evidence of liver toxicity.
52-week Oral (feed)/dog	0, 32, 112, 317, 1164 (male); 0, 34, 113, 278, 1233 (female)	1164 (male) and 1233 (female)	Not established	No adverse effects. A mild increase in liver weight in HDT males and females, and increase in alkaline phosphatase in HDT males, with no corresponding histopathological evidence of liver toxicity. Body weight gain increase in HDT males for weeks 8-9 compared to controls, with an increase in food efficiency in week 9.
2-Year Oral (feeding)/rat	0, 7.71, 39, 156, 805 (male); 0, 10.9, 51, 212, 1076 (female)	805 (male) and 1076 (female)	Not established	No evidence of carcinogenicity and no adverse findings. Increased adrenal cortical microvesiculation due to lipid was present in the zona fasciculata region of the adrenal gland of some male rats in all dose groups in both the one-year and main studies. This finding was considered test substance related but was not considered adverse as the adrenal morphology was generally in the range of what was observed in control rats, and the finding was not associated with any indication of cytotoxicity or other evidence of structural or functional impairment of the adrenal gland.
18-Month Oral (feeding)/ Mouse	0, 2.6, 9.2, 26.1, 158, 935 (male); 0, 3.34, 11.6, 32.9, 196, 1155 (female)	158 (male) and 1155 (female)	935 (male), no LOAEL established for female	No evidence of carcinogenicity. Eosinophilic foci accompanied by hepatocellular hypertrophy and increased liver weight form the bases for the male LOAEL of 935 mg/kg/day.
Two-generation oral study/rat	0, 200, 1000, 4000, 20000 ppm, mg/kg bw/d	1199 (male) and 1594 (female)	Not established	A slight increase in mean liver weights in P1 and F1 males and females at 238/318.9 mg/kg/day and above, slight increase in mean adrenal weight at 238/318.9 mg/kg/day and

Table 4. Subchronic, Chronic and Other Toxicity Profile

STUDY/ SPECIES	DOSES (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	EFFECTS
	equivalents: pre-mating: P1 m: 0, 12, 60, 238, 1199 F1 m: 0, 18, 89, 370, 1926 P1 f: 0, 16, 78, 318, 1594 F1 f: 0, 20, 104, 406, 2178 gestation: P1 f: 0, 14, 68, 278, 1373 F1 f: 0, 14, 71, 272, 1465 lactation: P1 f: 0, 32, 162, 654, 3118 F1 f: 0, 35, 183, 696, 3641			1199/1594 mg/kg/day P1 and F1 males and females. Mean body weight of 1199/1594 mg/kg/day F1 pups was slightly reduced on lactation days 7, 14 and 21. No effects on F2 offspring weights during lactation. Minimal to mild increase in adrenal cortical microvesiculation in P1 adult males and F1 adult males and females. P1 adult at 60.4/77.8 mg/kg/day and greater. F1 adult males at 12 mg/kg/day and greater. These effects were not observed in weanlings. No cytotoxicity or abnormal cellular structures were observed under light or electron microscopy.
Develop mental study/rat	0, 20, 100, 300, 1000	1000	Not established	No adverse effects.
Develop mental study/rabbit	0, 20, 100, 300, 1000	1000	Not established	No adverse effects.
Acute oral neuro-toxicity/rat	0, 200, 700, 2000 in 0.5% methyl cellulose	2000	Not established	No evidence of neurotoxicity was observed at any dose
Subchronic oral neuron-toxicity/rat	0, 12.7, 64.2, 255, 1313 (male); 0, 15.1, 77.3, 304, 1586 (female)	1313 (male) and 1586 (female)	Not established	No evidence of neurotoxicity was observed at any dose.
28-day Immuno-toxicity/rat	0, 74, 363, 1494 (male); 0, 82, 397, 1601 (female)	1494 (male) and 1601 (female)	Not established	No evidence of treatment-related effects on the sheep red blood cells specific antibody (IgM) responses in either male or female rats at any dietary concentration tested.
28-day Immuno-toxicity/ Mouse	0, 48, 264, 1144 (male); 0, 64, 362, 1566 (female)	1144 (male) and 1566 (female)	Not established	No evidence of treatment-related effect on the sheep red blood cells specific antibody (IgM) responses in either male or female mice at any dietary concentration tested.

Food Quality Protection Act (FQPA) Decisions:

The Agency concluded that the toxicology database is adequate for Food Quality Protection Act (FQPA) purposes and that there are no concerns or residual uncertainties for pre-/post-natal toxicity. Therefore, a FQPA factor of 1X was selected. That decision was based on the following findings:

a. The toxicology database for chlorantraniliprole is complete for the purposes of this risk assessment and the characterization of potential pre- and postnatal

risks to infants and children.

b. No susceptibility was identified in the toxicological database, and there are no residual uncertainties re: pre-and/or postnatal exposure.

c. There are no treatment-related neurotoxic findings in the acute and subchronic oral neurotoxicity studies in rats.

d. The exposure assessment is protective: the dietary food exposure assessment utilizes tolerance level residues and 100% crop treated information for all commodities; the drinking water assessment utilizes values generated by models and associated modeling parameters which are designed to provide conservative, health protective, high-end estimates of water concentrations. By using these screening-level exposure assessments, the chronic dietary (food and drinking water) risk is not underestimated.

e. Although residential exposure is expected over the short- and possibly intermediate-term (via the dermal and/or incidental oral route), there is no hazard expected via these routes/durations, and therefore no risk for these scenarios.

4. HUMAN HEALTH EXPOSURE AND RISK ASSESSMENT

Residue Profile:

Dietary Exposure and Risk:

Because an endpoint attributable to a single dose was not identified, the dietary exposure assessment considered only chronic exposure, since chlorantraniliprole was determined to be toxic only via the chronic oral exposure duration.

Chronic dietary risk assessments were conducted using the Dietary Exposure Evaluation Model (DEEM-FCID™, Version 2.03) which uses food consumption data from the U.S. Department of Agriculture's Continuing Surveys of Food Intakes by Individuals (CSFII) from 1994-1996 and 1998. The chronic assessments assumed that 100% of crops with requested uses of chlorantraniliprole are treated, and that all treated crops contain residues at tolerance level.

These assumptions result in conservative, health-protective estimates of exposure which are well below the Agency's level of concern (100% of the cPAD). The maximum estimate is less than 1% of the cPAD for all population subgroups. These analyses indicate that there are no dietary exposure considerations that would preclude registration of chlorantraniliprole for the requested uses.

A drinking water assessment for chlorantraniliprole, conducted based on PRZM/EXAMS (Pesticide Root Zone Model/Exposure Analysis Modeling System), was used to calculate the surface water estimated drinking water concentrations (EDWCs) and

the Screening Concentration in Ground Water (SCI-GROW) model was used to calculate the groundwater EDWC. The EDWCs do not exceed the Agency's level of concern.

Table 5. Results of Chronic Dietary Exposure and Risk Estimates for Chlorantraniliprole

Population Subgroup	cPAD, mg/kg/day	Chronic Estimates (Food only)		Chronic Estimates (Food and Drinking Water)	
		Exposure, mg/kg/day	Risk, % cPAD	Exposure, mg/kg/day	Risk, % cPAD
U.S. Population	1.58	0.007679	<1	0.007756	<1
All infants		0.007856	<1	0.008108	<1
Children 1-2 yrs		**0.014855**	**<1**	0.014969	**<1**
Children 3-5 yrs		0.012043	<1	0.012150	<1
Children 6-12 yrs		0.007999	<1	0.008073	<1
Youth 13-19 yrs		0.005850	<1	0.005906	<1
Adults 20-49 yrs		0.007082	<1	0.007154	<1
Adults 50+ yrs		0.007613	<1	0.007689	<1
Females 13-49 yrs		0.007215	<1	0.007286	<1

The population subgroup with the highest estimated exposure/risk is bolded.

Residential Exposure Estimates:

Although there are only two use sites (turfgrass and ornamental plants), as indicated on the 14 terrestrial non-food end use products, these use sites encompass a multitude of places that may be treated: home lawns, commercial lawns, industrial facilities, residential dwellings, business and office complexes, shopping complexes, multi-family residential complexes, institutional buildings, airports, cemeteries, interior plantscapes, ornamental gardens, parks, wildlife plantings, playgrounds, schools, daycare facilities, golf courses, athletic fields, sod farms and other landscaped areas. The multitude of use sites, in addition to the persistence of chlorantraniliprole, indicates there is potential for short- and intermediate-term postapplication dermal (adults and children) and incidental oral (children only) exposure to chlorantraniliprole (inhalation exposure is not expected due to low vapor pressure). However, due to the lack of toxicity over the acute, short- and intermediate-term via the oral and dermal routes – no risk is expected from these exposures.

Long-term (greater than 6 months) dermal exposure to turfgrass is not expected because the use pattern suggests a seasonal window of application, and dislodgeable foliar residue (DFR) data indicate a maximum half-life of only 30 days on foliage. While chlorantraniliprole's persistence in soil (half-life up to 1130 days in dissipation studies on bareground plots) increases the possibility of long-term exposure for toddlers via incidental ingestion, the daily quantity of soil a toddler would need to eat to reach the cPAD is not feasible (more than 4 lbs/day, even when accounting for accumulation).

Due to the lack of toxicity resulting from chlorantraniliprole exposure (other than chronic oral ingestion), spray drift is not expected to pose a risk to residents near spraying operations.

Aggregate Risk:

Although there is potential exposure to chlorantraniliprole from food, drinking water and residential use sites, the only identified hazard is via the oral route over a chronic duration. Residential exposures are expected to occur over a short- or intermediate-term duration. Therefore, the aggregate risk assessment considers only exposures from food and drinking water consumed over a long-term duration (greater than 6 months of daily exposure). That decision was based on the following findings:

a. **Acute Risk**. No acute risk is expected because no acute hazard, attributable to a single dose, was identified.

b. **Chronic Risk.** Using exposure assumptions, we concluded that exposure to chlorantraniliprole from food and water will utilize <1% of the cPAD for the population group children 1-2 years (the highest exposed subpopulation). Based on the use pattern, chronic residential exposure to residues of chlorantraniliprole is not expected.

c. **Short-Term/Intermediate Risk.** There is potential for short- and intermediate-term post-application dermal (adults and children) and incidental oral (children only) exposure to chlorantraniliprole. However, due to the lack of toxicity via dermal route, as well as the lack of toxicity over the acute, short- and intermediate-term via the oral route – no risk is expected from these exposures. Inhalation exposure is not expected due to the low vapor pressure of chlorantraniliprole (so applied/deposited residues are not expected to volatilize into the air).

d. **Aggregate Cancer Risk.** Chlorantraniliprole has been classified as a "not likely human carcinogen." It is not expected to pose a cancer risk to humans.

e. **Determination of Safety.** Based on the risk assessments, we conclude that there is a reasonable certainty that no harm will result to the general population, or to infants and children from aggregate exposure to chlorantraniliprole residues.

Occupational Exposure:

The chlorantraniliprole toxicology database indicates there is no systemic hazard associated with short- and intermediate-term dermal and inhalation exposure, and therefore, no occupational exposure and risk assessment was conducted.

5. ENVIRONMENTAL EXPOSURE AND RISK

Environmental Fate Characteristics:

Chlorantraniliprole may be characterized as persistent and mobile in terrestrial and aquatic environments. Extended chlorantraniliprole use is expected to cause

accumulation of residues in soil from year to year. Major routes of dissipation are expected to be alkaline-catalyzed hydrolysis, photodegradation in water, leaching, and runoff.

Nine degradates/metabolites of the parent compound have been identified in environmental fate studies: IN-EQW78, IN-LBA22, IN-LBA24, IN-LBA23 IN-ECD73, IN-F6L99, IN-EVK64, IN-F9N04, and IN-GAZ70 (see Table 7). The greatest percentage production of a degradate was for IN-LBA24, which was 90% of applied parent produced in the photolysis study at pH7. The risk assessment did not quantify the risks from these degradates because they were commonly of lower toxic potency than the parent. For example IN-LBA24 is orders of magnitude less toxic than the parent pesticide. Coupling the observed lower toxic potency with the risk assessments exposure modeling assumptions of stability for the parent would suggest that excluding the degradates from quantitative risk estimation would not substantially affect the conclusion of the risk assessment.

Table 6. Laboratory Environmental Fate Data for Chlorantraniliprole

Data	Units	Value
Molecular Weight	g/mole	483.15
Solubility	mg/L	1.023
Vapor Pressure	Torr	1.57E-13
Henrys Constant	atm m^3/mol	3.1E-15
Hydrolysis @ pH 7	Days	Stable
Photodegradation in Water	Days	0.31
Aerobic Soil Metabolism	Days	577.6[1] 537.3 374.6 410.1 246.6 228.0 888.6 924.1 396.0
Aerobic Aquatic Metabolism	Days	231 125
Anaerobic Aquatic Metabolism	Days	208
Soil:Water Coefficients (Average K_{oc})	L/g	153-loam sand 509-silty clay loam 272-sandy loam 526-loamy sand 180-loam

Table 7. Identified Degrades/Metabolites

Study	Degradation Product	Maximum Formation Percentage (% of applied parent)	Chemical Name
Hydrolysis	IN-EQW78	86.7 @ pH 9	(2-[3-Bromo-1-(3-chloro-2-

Table 7. Identified Degrades/Metabolites

Study	Degradation Product	Maximum Formation Percentage (% of applied parent)	Chemical Name
			pyridinyl)-1H-pyrazol-5-yl]-6-chloro-3,8 dimethyl-4(3H)-quinazolinone
Photodegradation in Water	IN-EQW78	ND @ pH 7 buffer solution ND @ natural water, sterile	(2-[3-Bromo-1-(3-chloro-2-pyridinyl)-1H-pyrazol-5-yl]-6-chloro-3,8 dimethyl-4(3H)-quinazolinone
	IN-LBA22	52.1 @ pH 7 buffer solution 3.4 @ natural water, sterile	
	IN-LBA24	90.2 @ pH 7 buffer solution 89.3 @ natural water, sterile	
	IN-LBA23	40.8 @ pH 7 buffer solution 51.4 @ natural water, sterile	
Soil Metabolism	IN-F6L99	2.1 @ 25^{0}C incubation 5.2 @ 35^{0}C incubation 4.2 @ 49^{0}C incubation	N-Methyl-[3-bromo-1H-pyrazol-5-yl]carboxylic acid
	IN-EVK64	ND @ 25^{0}C incubation 1.7 @ 35^{0}C incubation 5.3 @ 49^{0}C incubation	
	IN-EQW78	9.5 @ 25^{0}C incubation 33.3 @ 35^{0}C incubation 71.6 @ 49^{0}C incubation	(2-[3-Bromo-1-(3-chloro-2-pyridinyl)-1H-pyrazol-5-yl]-6-chloro-3,8 dimethyl-4(3H)-quinazolinone
	IN-ECD73	4.9 @ 25^{0}C incubation 8.2 @ 35^{0}C incubation 9.1 @ 49^{0}C incubation	2-[3-bromo-1-(3-chloro-2-pyridinyl)-1H-pyrazole-5-yl]-6-chloro-3,8-dimethyl-4(3H)-quinazolinone
	INGAZ70	4.3 @ 25^{0}C incubation 7.4 @ 35^{0}C incubation 1.0 @ 49^{0}C incubation	2-[3-bromo-1-(3-chloro-2-pyridinyl)-1H-pyrazol-5-yl]-6-chloro-8-methyl-4(1H)-quinazolinone
Water/Sediment Metabolism	IN-EQW78	30.2 @ no photodegradation 40.9 @ photodegradation	(2-[3-Bromo-1-(3-chloro-2-pyridinyl)-1H-pyrazol-5-yl]-6-chloro-3,8 dimethyl-4(3H)-quinazolinone
	IN-F6L99	4.2 @ no photodegradation ND @ photodegradation	5-bromo-N-methyl-1H-pyrazole-3-carboxamide
	IN-F9N04	2.7 @ no photodegradation ND @ photodegradation	N-[2-(Aminocarbonyl)-4-chloro-6-methylphenyl]-3-bromo-1-(3-chloro-2-pyridinyl)1H-pyrazole-5-carboxamide
	IN-GAZ70	3.0 @ no photodegradation ND @ photodegradation	2-[3-bromo-1-(3-chloro-2-pyridinyl)-1H-pyrazol-5-yl]-6-chloro-8-methyl-4(1H)-quinazolinone
	IN-ECD73	4.7 @ no photodegradation 0.8 @ photodegradation	2-[3-bromo-1-(3-chloro-2-pyridinyl)-1H-pyrazole-5-yl]-6-

Table 7. Identified Degrades/Metabolites

Study	Degradation Product	Maximum Formation Percentage (% of applied parent)	Chemical Name
			chloro-3,8-dimethyl-4(3H)-quinazolinone
	INLBA22	11.1 @ no photodegradation ND @ photodegradation	
	INLBA24	4.6 @ no photodegradation 1.5 @ photodegradation	
	INLNA23	2.3 @ no photodegradation 0.5 @ photodegradation	

Ecological Effects and Risk:

Chlorantraniliprole can be characterized as having very little toxicity to terrestrial and aquatic vertebrates. As can be expected for an insecticide, the compound is toxic to a number of terrestrial and aquatic invertebrates. The compound can produce limited adverse effects in terrestrial and aquatic plants.

Available data for formulated products suggested no concern for enhanced toxicity of formulations versus the active ingredient alone. Data for degradates suggest no concern for toxicity exceeding the parent compound and in most cases toxicity is orders of magnitude below the parent.

Terrestrial Hazard

Birds-

Chlorantraniliprole, degradates and formulated products can be characterized as being practically non-toxic from the acute oral and dietary perspectives. The available data show no indications that formulated product, metabolites, or degradates are more toxic than the active ingredient.

Table 8. Available Bird Toxicity Data for Chlorantraniliprole, Formulations, and Degradates

Test Material Identification	Nature of Tested Material	Registrant Study ID	Test Species	Test Type	Endpoint Type	Effects Value Based on A.S.	Units of Active Substance
Chlorantraniliprole Technical	Technical	DuPont-14380	*Anas platyrhynchos (Mallard)*	Subacute dietary	LC 50 NOAEC	>5620 5620	mg/kg diet
Chlorantraniliprole Technical	Technical	DuPont-14384	*Anas platyrhynchos (Mallard)*	Reproduction	LOAEC (viable embryo reduction) NOAEC	250 500	mg/kg diet
Chlorantraniliprole Technical	Technical	DuPont-14378	*Colinus virginianus (Northern bobwhite)*	Acute oral dose	LD 50 NOAEL	>2250 2250	mg/kg bw
Chlorantraniliprole Technical	Technical	DuPont-14379	*Colinus virginianus (Northern bobwhite)*	Subacute dietary	LC 50 NOAEC)	>5620 5620	mg/kg diet

Table 8. Available Bird Toxicity Data for Chlorantraniliprole, Formulations, and Degradates

Test Material Identification	Nature of Tested Material	Registrant Study ID	Test Species	Test Type	Endpoint Type	Effects Value Based on A.S.	Units of Active Substance
Chlorantraniliprole Technical	Technical	DuPont-14383	*Colinus virginianus (Northern bobwhite)*	Reproduction	LOAEC (egsheell thinning) NOAEC	250 120	mg/kg-diet
IN-EQW78	Technical metabolite	DuPont-18859	*Colinus virginianus (Northern bobwhite)*	Acute oral dose	LD 50 NOAEL	>2250 2250	mg IN-EQW78/kg bw
Chlorantraniliprole 20SC	Formulated Product	DuPont-18945	*Colinus virginianus (Northern bobwhite)*	Acute oral dose	LD 50 NOAEL(transient clinical signs, no mortality)	>2000 432	mg a.i./kg bw
Chlorantraniliprole 35WG	Formulated Product	DuPont-18946	*Colinus virginianus (Northern bobwhite)*	Acute oral dose	LD 50 NOAEL(transient clinical signs, no mortality)	>2250 486	mg a.i./kg bw
Chlorantraniliprole 20SC	Formulated Product	DuPont-19420	*Colinus virginianus (Northern bobwhite)*	Subacute dietary	LC 50 NOAEC	>5620 5620	mg a.i./kg diet

Mammals-

Acute toxicity study effects for the technical active ingredient in mammals are reported as follows:

Acute Oral Toxicity LD50: >5000 mg/kg (Rat)
Acute Dermal Toxicity LD50: >5000 mg/kg (Rat)
Acute Inhalation Toxicity LC50: >5.1 mg/L (Rat)

Formulated products are as equally non-toxic following acute exposures as is technical chlorantraniliprole. A single dose of chlorantraniliprole 20SC [200 g/L (w/v); 18.5% (w/w)] (chlorantraniliprole 20SC) was administered by oral gavage to three fasted female rats at a dose of 5000 mg/kg. The rats were dosed one at a time at a minimum of 48-hour intervals. All rats survived until the scheduled sacrifice. No clinical signs of toxicity were observed, and no body weight loss occurred after dosing. No gross lesions were present in the rats at necropsy. A single dose of chlorantraniliprole 35WG was administered by oral gavage to one fasted female rat each at a dose of 175, 550, or 1750 mg/kg and to three fasted female rats at a dose of 5000 mg/kg. No deaths occurred. The rats exhibited no clinical signs of toxicity during the study. No body weight losses occurred after dosing. No gross lesions were present in the rats at necropsy. For the purposes of this risk assessment, to facilitate a comparison of estimated dietary residues with toxicity endpoints for acute effects, the existing rate oral LD50 toxicity study was used to estimate a dietary concentration of the pesticide that would correspond to a daily oral dose equivalent to the LD50. To accomplish this, a conservative ingestion rate of 100 percent of the body weight was applied. The resulting estimated dietary acute toxicity endpoint is >5000 mg/kg-diet [(>5000 mg/kg-bw)(1 kg-bw/1kg-diet) = >5000 mg/kg-diet].

In developmental toxicity studies in rats and rabbits, chlorantraniliprole exhibited no effects on any parameter in pregnant females or their offspring at levels up to and including the maximum tested dose of 1,000 mg/kg bw/day. The NOAEL for this study is 1,000 mg/kg/day.

No reproduction toxicity was observed in a two-generation reproduction study with chlorantraniliprole in rats. No adverse effects were observed on reproduction, fertility, sperm parameters, estrous cycle, litter size, pup survival and developmental landmarks up to the maximum tested dose of 20,000 ppm in the diet. There were no adverse histological findings indicative of reproductive toxicity. There was a slight reduction in the F1 pup (but not F2 pup) weight during lactation at the highest dose level (mean maternal intake during lactation equal to 3118 mg/kg-bw/day); this was attributed, in part, to weight loss in one dehydrated dam during lactation which had a litter with some of the lowest pup weights. The slight change in pup weight was without subsequent effects since overall body weight, weight gain and development in F1 rats fed 20,000 ppm were similar to control animals. The NOAEC for this study is 20,000 ppm or 1000 mg/kg bw/day as a NOAEL (estimated).

Invertebrates-

The available formulated product data, when adjusted for active ingredient suggest that there is no practical difference between the toxicity of active ingredient and formulated products to bees.

Table 9. Terrestrial Invertebrate Toxicity Data for Chlorantraniliprole, Formulations, and Degradates

Test Material Identification	Nature of Tested Material	Registrant Study ID	Test Species	Test Type	Endpoint Type	Effects Value Based on A.S.	Units of Active Substance
Chlorantraniliprole 20SC	Formulated Product	DuPont-18423	*Aphidius rhopalosiphi*	Mortality and reproduction	LR 50 and ER 50	>750	g. chlorantraniliprole/ha
Chlorantraniliprole 35WG	Formulated Product	DuPont-12405	*Aphidius rhopalosiphi*	Mortality and reproduction	LR 50 and ER 50	>750	g. chlorantraniliprole/ha
Chlorantraniliprole 35WG	Formulated Product	DuPont-12753	*Apis mellifera (Honeybee)*	Semi-field	NOEC	156.16	g. chlorantraniliprole/ha
Chlorantraniliprole 35WG	Formulated Product	DuPont-14387	*Apis mellifera (Honeybee)*	Acute oral	LD50	>0.119	mg. chlorantraniliprole/bee
Chlorantraniliprole 35WG	Formulated Product	DuPont*-14387	*Apis mellifera (Honeybee)*	Acute contact	LD50	>0.100	mg. chlorantraniliprole/bee
Chlorantraniliprole 20SC	Formulated Product	DuPont-14388	*Apis mellifera (Honeybee)*	semi-field	NOAEC	52.5	g. chlorantraniliprole/ha
Chlorantraniliprole 20SC	Formulated Product	DuPont-14706	*Apis mellifera (Honeybee)*	semi-field	NOAEC	52.5	g. chlorantraniliprole/ha
Chlorantraniliprole 35WG	Formulated Product	DuPont-16269	*Apis mellifera (Honeybee)*	Acute	Mortality <4%	112.5	g. chlorantraniliprole/ha
Chlorantraniliprole 20SC	Formulated Product	DuPont-16271	*Apis mellifera (Honeybee)*	semi-field	NOAEC	>60	g chlorantraniliprole/ha
Chlorantraniliprole 20SC	Formulated Product	DuPont-16272	*Apis mellifera (Honeybee)*	semi-field	NOAEC	>60	g chlorantraniliprole/ha
Chlorantraniliprole 20SC	Formulated Product	DuPont-17208	*Apis mellifera (Honeybee)*	semi-field	NOAEC	60	g. chlorantraniliprole/ha
Chlorantraniliprole 20SC	Formulated Product	DuPont-17247	*Apis mellifera (Honeybee)*	semi-field	LOAEC (mortality and decreased	>60	g. chlorantraniliprole/ha

Table 9. Terrestrial Invertebrate Toxicity Data for Chlorantraniliprole, Formulations, and Degradates

Test Material Identification	Nature of Tested Material	Registrant Study ID	Test Species	Test Type	Endpoint Type	Effects Value Based on A.S.	Units of Active Substance
					flight intensity)		
Chlorantraniliprole 20SC	Formulated Product	DuPont-17248	*Apis mellifera (Honeybee)*	semi-field	LOAEC (mortality and decreased flight intensity)	60	g. chlorantraniliprole/ha
Chlorantraniliprole Technical	Technical	DuPont-17582	*Apis mellifera (Honeybee)*	Acute oral	LD 50	>0.0274 >104.1	µg/bee in water µg/bee in acetone chlorantraniliprole/bee
Chlorantraniliprole 20SC	Formulated Product	DuPont-18085	*Apis mellifera (Honeybee)*	semi-field	NOAEC	60	g. chlorantraniliprole/ha
Chlorantraniliprole 20SC	Formulated Product	DuPont-18086	*Apis mellifera (Honeybee)*	semi-field	LOAEC (mortality and decreased flight intensity)	60	g. chlorantraniliprole/ha
Chlorantraniliprole 20SC	Formulated Product	DuPont-18087	*Apis mellifera (Honeybee)*	semi-field	NOAEC	60	g. chlorantraniliprole/ha
Chlorantraniliprole 20SC	Formulated Product	DuPont-18426	*Apis mellifera (Honeybee)*	Acute oral	LD 50	>114.1	µg. chlorantraniliprole/bee
Chlorantraniliprole 20SC	Formulated Product	DuPont-17301	*Chrysoperla carnea (Green lacewing) larvae*	Mortality Reproduction	EC50 LOEC	120 120	g chlorantraniliprole/ha
Chlorantraniliprole 20SC	Formulated Product	DuPont-19746	*Coccinella septempunctata (Lady bird beetle)*	Mortality Reproduction	LOAEC LOAEC	60 60	g. chlorantraniliprole/ha
Chlorantraniliprole 20SC	Formulated Product	DuPont-17300	*Coccinella septempunctata (Lady bird beetle) larvae*	Mortality Reproduction	EC50 LOEC	<120 120	g. chlorantraniliprole/ha
Chlorantraniliprole	Technical	DuPont-14398	*Eisenia fetida (Earthworm)*	Acute	LC 50	>1000	mg chlorantraniliprole /kg soil dry weight.
IN-EQW78	Technical metabolite	DuPont-15389	*Eisenia fetida (Earthworm)*	Acute	LC 50	>1000	mg IN-EQW78/kg soil dry weight.
Chlorantraniliprole 35WG	Formulated Product	DuPont-16694	*Eisenia fetida (Earthworm*	Reproduction Growth	NOAEC	350	mg chlorantraniliprole /kg soil dry weight.
IN-EQW78	Technical metabolite	DuPont-17093	*Eisenia fetida (Earthworm*	Reproduction Growth	NOAEC	1000	mg IN-EQW78/kg soil dry weight.
IN-F6L99	Technical metabolite	DuPont-17631	*Eisenia fetida (Earthworm)*	Acute	LC 50	632.5	mg IN-F6L99/kg soil dry weight.
IN-ECD73	Technical metabolite	DuPont-17632	*Eisenia fetida (Earthworm)*	Reproduction Growth	NOAEC	1000	mg IN-ECD73/kg artificial soil dry weight
IN-GAZ70	Technical metabolite	DuPont-17633	*Eisenia fetida (Earthworm)*	Reproduction Growth	NOAEC	1000	mg IN-GAZ70/kg soil dry weight
Chlorantraniliprole 35WG	Formulated Product	DuPont-18817	*Eisenia fetida (Earthworm)*	Acute	LC 50	>350	mg chlorantraniliprole/kg drysoil
Chlorantraniliprole 20SC	Formulated Product	DuPont-18818	*Eisenia fetida (Earthworm)*	Acute	LC 50	>200	mg chlorantraniliprole/kg drysoil
Chlorantraniliprole 20SC	Formulated Product	DuPont-16532	*Episyrphus balteatus (Hoverfly)*	Mortality	LR100	120	g chlorantraniliprole/ha
Chlorantraniliprole 20SC	Formulated Product	DuPont-18082	*Episyrphus balteatus (Hoverfly)*	Mortality Reproduction	LR 50 ER 50	12.6 13.3	g chlorantraniliprole/ha
Chlorantraniliprole 20SC	Formulated Product	DuPont-19747	*Episyrphus balteatus (Hoverfly)*	Mortality 1st treatment Mortality 2nd	<control >control	60 60	G chlorantraniliprole/ha twice with 7-day interval

Table 9. Terrestrial Invertebrate Toxicity Data for Chlorantraniliprole, Formulations, and Degradates

Test Material Identification	Nature of Tested Material	Registrant Study ID	Test Species	Test Type	Endpoint Type	Effects Value Based on A.S.	Units of Active Substance
				treatment Reproduction	NOAEL	60	
Chlorantraniliprole 35WG	Formulated Product	DuPont-18084	*Episyrphus balteatus (Hoverfly)*	Mortality Reproduction	LR50 ER 50	4.64 >4.4	g. chlorantraniliprole/ha
Chlorantraniliprole 35WG	Formulated Product	DuPont-20303	*Episyrphus balteatus (Hoverfly)*	Mortality 1st treatment Mortality 2nd treatment Reproduction	<control <control NOAEL	60 60 60	g. chlorantraniliprole/ha twice with 7-day interval
IN-EQW78	Technical metabolite	DuPont-16531	*Folsomia candida (Springtail)*	Reproduction	EC 50 NOEC	>100 100	mg IN-EQW78/kg dry soil
IN-ECD73	Technical metabolite	DuPont-17083	*Folsomia candida (Springtail)*	Reproduction	EC 50 NOEC	>100 100	mg IN-ECD73/kg dry soil
Chlorantraniliprole	Technical	DuPont-18730	*Folsomia candida (Springtail)*	Reproduction	EC 50 NOEC	0.48 0.39	mg chlorantraniliprole /kg dry soil
Chlorantraniliprole	Technical	DuPont-19748	*Hypoaspis aculeifer (mite)*	Reproduction	NOAEC	100	mg chlorantraniliprole /kg dry soil
Chlorantraniliprole 20SC	Formulated Product	DuPont-18081 RV1	*Orius laevigatus*	Mortality and reproduction	LR 50 & ER 50	>120	g. chlorantraniliprole/ha
Chlorantraniliprole 35WG	Formulated Product	DuPont-12406	*Typhlodromus pyri*	Mortality and reproduction	LR 50 and ER 50	>750	g. chlorantraniliprole/ha
Chlorantraniliprole 20SC	Formulated Product	DuPont-14704	*Typhlodromus pyri*	Mortality and reproduction	LR 50 ER 50	>750	g. chlorantraniliprole/ha
Chlorantraniliprole 20SC	Formulated Product	DuPont-17312	*Typhlodromus pyri*	Population study	NOAEC	750	g. chlorantraniliprole/ha
Chlorantraniliprole 35WG	Formulated Product	DuPont-14705	*Typhlodromus pyri*	Population reduction (transient)	LOAEC	52.5	g. chlorantraniliprole/ha
Chlorantraniliprole 20SC	Formulated Product	DuPont-18424	*Typhlodromus pyri*	Mortality and reproduction	LR 50 and ER 50	>750	g. chlorantraniliprole/ha

Aquatic Hazard-

Freshwater Fish-

While non-definitive LC50 values are only available for chlorantraniliprole, it can be characterized as being slightly to practically non-toxic to freshwater fish. The available data show no indications that formulated products are more toxic than active ingredient.

Table 10. Freshwater Fish Toxicity Data for Chlorantraniliprole, Formulations, and Degradates

Test Material Identification	Nature of Tested Material	Registrant Study ID	Test Species	Test Type	Endpoint Type	Effects Value Based on A.S.	Units of Active Substance
Chlorantraniliprole Technical	Technical	DuPont-14278	*Ictalurus punctatus (Channel*	Acute	LC 50	>13.4	mg chlorantraniliprole/L

Table 10. Freshwater Fish Toxicity Data for Chlorantraniliprole, Formulations, and Degradates

Test Material Identification	Nature of Tested Material	Registrant Study ID	Test Species	Test Type	Endpoint Type	Effects Value Based on A.S.	Units of Active Substance
			catfish)				
Chlorantraniliprole Technical	Technical	DuPont-12333	*Lepomis macrochirus (Bluegill sunfish)*	Acute	LC 50	>15.1	mg chlorantraniliprole/L
Chlorantraniliprole Technical	Technical	DuPont-12332	*Oncorhynchus mykiss (Rainbow trout)*	Acute	LC 50	>13.8	mg chlorantraniliprole/L
Chlorantraniliprole Technical	Technical	DuPont-14279	*Oncorhynchus mykiss (Rainbow trout)*	Chronic	NOAEC	0.11	mg chlorantraniliprole/L
Chlorantraniliprole 35WG	Formulated Product	DuPont-15396	*Lepomis macrochirus (Bluegill sunfish)*	Acute	LC 50	>1.19	mg chlorantraniliprole/L
Chlorantraniliprole 20SC	Formulated Product	DuPont-18602	*Lepomis macrochirus (Bluegill sunfish)*	Acute	LC 50	>1.84	mg chlorantraniliprole/L
Chlorantraniliprole 35WG	Formulated Product	DuPont-15386	*Oncorhynchus mykiss (Rainbow trout)*	Acute	LC 50	>1.09	mg chlorantraniliprole/L
Chlorantraniliprole 20SC	Formulated Product	DuPont-18601	*Oncorhynchus mykiss (Rainbow trout)*	Acute	LC 50	>2.16	mg chlorantraniliprole/ha

Freshwater Invertebrates-

Chlorantraniliprole can be characterized as very highly toxic to freshwater invertebrates. The available data show no indications that formulated product, metabolites, or degradates are more toxic than active ingredient.

Table 11. Freshwater Invertebrate Toxicity Data for Chlorantraniliprole, Formulations, and Degradates

Test Material Identification	Nature of Tested Material	Registrant Study ID	Test Species	Test Type	Endpoint Type	Effects Value Based on A.S.	Units of Active Substance
Chlorantraniliprole Technical	Technical	DuPont-18428	*Brachionus calyciflorus*	Acute	EC 50	>1.00	mg chlorantraniliprole/L
Chlorantraniliprole Technical	Technical	DuPont-15109	*Centroptilum triangulifer (Mayfly)*	Acute	LC 50	0.0116	mg chlorantraniliprole/L
Chlorantraniliprole Technical	Technical	DuPont-17585	*Chimarra atterima (Caddisfly)*	Acute	LC 50	0.0117	mg chlorantraniliprole/L
Chlorantraniliprole Technical	Technical	DuPont-15112	*Chironomus riparius (Midge)*	Acute	LC 50	0.0859	mg chlorantraniliprole/L
Chlorantraniliprole Technical	Technical	DuPont-14396	*Chironomus riparius (Midge)*	Chronic	NOAEC (pore water from 28-d sediment study	0.005	mg chlorantraniliprole/kg spiked sediment dry weight
Chlorantraniliprole Technical	Technical	DuPont-18090	*Copepods (of the suborder Cyclopoida)*	Acute	LC 50	>1.00	mg chlorantraniliprole technical/L
Chlorantraniliprole	Technical	DuPont-	*28-day old*	Acute	EC 50	0.0166	mg chlorantraniliprole/L

Table 11. Freshwater Invertebrate Toxicity Data for Chlorantraniliprole, Formulations, and Degradates

Test Material Identification	Nature of Tested Material	Registrant Study ID	Test Species	Test Type	Endpoint Type	Effects Value Based on A.S.	Units of Active Substance
Technical		15868	*Daphnia magna (Water flea)*				
Chlorantraniliprole Technical	Technical	DuPont-12411*	*Daphnia magna (Water flea)*	Acute	EC 50	0.0116	mg chlorantraniliprole/L
Chlorantraniliprole Technical	Technical	DuPont-12754 RV1	*Daphnia magna (Water flea)*	Chronic	NOAEC	0.00447	mg chlorantraniliprole/L
LBA24-002	Technical metabolite	DuPont-14889 RV1	*Daphnia magna (Water flea)*	Acute	EC 50 NOAEC	>10 10	mg LBA24-002/L
LBA22-002	Technical metabolite	DuPont-14890 RV1	*Daphnia magna (Water flea)*	Acute	EC 50 NOAEC	>0.24 0.24	mg LBA22-002/L
Chlorantraniliprole 35WG	Formulated Product	DuPont-15113	*Daphnia magna (Water flea)*	Acute	EC 50	0.011	mg chlorantraniliprole/L
IN-EQW78	Technical metabolite	DuPont-15388	*Daphnia magna (Water flea)*	Acute	EC 50 NOAEC	>0.138 0.138	mg IN-EQW78/L
Chlorantraniliprole Technical	Technical	DuPont-15874	*Daphnia magna (Water flea)*	Chronic	NOAEC	0.00447	mg chlorantraniliprole/L
LBA23-000		DuPont-16754 RV1	*Daphnia magna (Water flea)*	Acute	EC 50 NOAEC	>0.01	mg LBA23-000/L
Chlorantraniliprole Technical	Technical	DuPont-17653	*Daphnia magna (Water flea)*	Acute	EC 50	0.0098	mg chlorantraniliprole/L
IN-GAZ70	Technical metabolite	DuPont-18387	*Daphnia magna (Water flea)*	Acute	EC 50 NOAEC	>0.00987 0.00987	mg IN-GAZ70/L
Chlorantraniliprole 20SC	Formulated Product	DuPont-18427 RV1	*Daphnia magna (Water flea)*	Acute	EC 50	0.0071	mg chlorantraniliprole/L
IN-ECD73	Technical metabolite	DuPont-18472	*Daphnia magna (Water flea)*	Acute	EC 50 NOAEC	>0.013 0.0138	mg IN-ECD73/L
IN-F6L99	Technical metabolite	DuPont-18473	*Daphnia magna (Water flea)*	Acute	EC 50	46.8	mg IN-F6L99/L
IN-F9N04	Technical metabolite	DuPont-18474	*Daphnia magna (Water flea)*	Acute	EC 50	0.03	mg IN-F9N04/L
Chlorantraniliprole Technical	Technical	DuPont-15877	*Gammarus pseudolimnaeus*	Acute	LC 50	0.0351	mg chlorantraniliprole/L
Chlorantraniliprole Technical	Technical	DuPont-15114	*Hyalella azteca*	Acute	LC 50	>0.389	mg chlorantraniliprole/L
Chlorantraniliprole Technical	Technical	DuPont-15873	*Lumbriculus variegatus (California blackworm)*	Acute	LC 50	>1.49	mg chlorantraniliprole/L
Chlorantraniliprole Technical	Technical	DuPont-15872	*Oronectes virilis (Crayfish)*	Acute	LC 50	>1.42	mg chlorantraniliprole/L
Chlorantraniliprole Technical	Technical	DuPont-18804	*Soyedina carolinensis (Carolina Forestfly)*	Acute	LC 50	>0.978	mg chlorantraniliprole/L

Estuarine/Marine Animals

Estuarine/Marine Fish-

While non-definitive LC50 values are only available for chlorantraniliprole, it can be characterized as being slightly to practically non-toxic to estuarine/marine fish.

Table 12. Estuarine/Marine Fish Toxicity Data for Chlorantraniliprole,

Formulations, and Degradates

Test Material Identification	Nature of Tested Material	Registrant Study ID	Test Species	Test Type	Endpoint Type	Effects Value Based on A.S.	Units of Active Substance
Chlorantraniliprole Technical	Technical	DuPont-12334	*Cyprinodon variegatus (Sheepshead minnow)*	Acute	LC 50	>12.0	mg/L
Chlorantraniliprole Technical	Technical	DuPont-14394	*Cyprinodon variegatus (Sheepshead minnow)*	Early Life Stage Toxicity	NOAEC	1.28	mg/L

Estuarine/Marine Invertebrates-

Chlorantraniliprole is very highly toxic to certain estuarine marine invertebrates, based on the data for the eastern oyster. Because the most sensitive species acutely (oyster) is not represented by chronic values, the acute to chronic ratio for the mysid (1.15/0.695 = 1.65) was applied to the oyster LC50 to estimate a chronic effects endpoint for this species (0.0399 mg/L/1.65 = 0.024 mg/L).

Table 13. Estuarine/Marine Invertebrate Toxicity Data for Chlorantraniliprole, Formulations, and Degradates

Test Material Identification	Nature of Tested Material	Registrant Study ID	Test Species	Test Type	Endpoint Type	Effects Value Based on A.S.	Units of Active Substance
Chlorantraniliprole Technical	Technical	DuPont-12335	*Americamysis bahia (Mysid shrimp)*	Acute	LC 50	1.15	mg chlorantraniliprole/L
Chlorantraniliprole Technical	Technical	DuPont-14397	*Americamysis bahia (Mysid shrimp)*	Chronic	NOAEC	0.695	mg chlorantraniliprole/L
Chlorantraniliprole Technical	Technical	DuPont-12412	*Crassostrea virginica (Eastern oyster)*	Acute	EC 50	0.0399	mg chlorantraniliprole/L

Plants

Terrestrial Plants-

The following table presents the available terrestrial plant toxicity data.

Table 14. Terrestrial Plant Toxicity Data for Chlorantraniliprole, Formulations, and Degradates

Test Material Identification	Nature of Tested Material	Registrant Study ID	Test Species	Test Type	Endpoint Type	Effects Value Based on A.S.	Units of Active Substance
Chlorantraniliprole 20SC	Formulated Product	DuPont-19074	*Zea mays (corn)* *Avena sativa (oat)* *Allium cepa (common onion)* *Lolium perenne (perennial ryegrass)*	Vegetative vigor	EC25 dicots EC5 dicots	>300 >300 cucumber, rape <300 all others	g. chlorantraniliprole /ha

Table 14. Terrestrial Plant Toxicity Data for Chlorantraniliprole, Formulations, and Degradates

Test Material Identification	Nature of Tested Material	Registrant Study ID	Test Species	Test Type	Endpoint Type	Effects Value Based on A.S.	Units of Active Substance
			Cucumis sativa (cucumber) *Brassica napus (rape)* *Pisum sativum (pea)* *Glycine max (soybean)* *Beta vulgaris (sugarbeet)* *Lycopersicon esculentum (tomato)*		EC25 monocots EC5 monocots	>300 <300 Onion >300 otherl species	
Chlorantraniliprole 20SC	Formulated Product	DuPont-19075	*Zea mays (corn)* *Avena sativa (oat)* *Allium cepa (common onion)* *Lolium perenne (perennial ryegrass)* *Cucumis sativa (cucumber)* *Brassica napus (rape)* *Pisum sativum (pea)* *Glycine max (soybean)* *Beta vulgaris (sugarbeet)* *Lycopersicon esculentum (tomato)*	Seedling emergence	EC25 monocots EC5 monocots EC25 dicots EC5 dicots	>300 (except rygrass with 34% effect) <300 <300 all others >300 <300 (cucumber, rape, pea, sugar beet) >300 otherl species	g. chlorantraniliprole /ha

Aquatic Plants-

The following table presents the available aquatic plant toxicity data.

Table 15. Aquatic Plant Toxicity Data for Chlorantraniliprole, Formulations, and Degradates

Test Material Identification	Nature of Tested Material	Registrant Study ID	Test Species	Test Type	Endpoint Type	Effects Value Based on A.S.	Units of Active Substance
Chlorantraniliprole Technical	Technical	DuPont-14390	*Anabaena flos-aquae (Blue-green algae)*	Growth / Reproduction	EC50 NOAEC	>2 2	mg. chlorantraniliprole/L
Chlorantraniliprole Technical	Technical	DuPont-12409 RV1	*Lemna gibba (Duckweed)*	Growth / Reproduction	EC50 NOAEC	>2 2	mg. chlorantraniliprole/L
Chlorantraniliprole Technical	Technical	DuPont-14392 RV1	*Navicula pelliculosa*	Growth / Reproduction	EC50 NOEC	>15.1 15.1	mg. chlorantraniliprole/L
Chlorantraniliprole	Technical	DuPont-	*Selenastrum*	Growth /	EC50	>2	mg.

Technical		12408 RV1	*capricornutum (Green algae)*	Reproduction	NOEC	2	chlorantraniliprole/L
Chlorantraniliprole Technical	Technical	DuPont-14391	*Skeletonema costatum*	Growth / Reproduction	EC50 NOEC	>14.6 14.6	mg. chlorantraniliprole/L
Chlorantraniliprole 20SC	Formulated Product	DuPont-18088	*Pseudokirchneriella subcapitata (Green algae)*	Growth / Reproduction	EC50 NOEC	>4 4	mg. chlorantraniliprole/L
Chlorantraniliprole 35WG	Formulated Product	DuPont-18089	*Pseudokirchneriella subcapitata (Green algae)*	Growth / Reproduction	EC50 NOEC	>1.78 1.78	mg. chlorantraniliprole/L

Exposure and Risk to Terrestrial and Aquatic Organisms:

For the purposes of the risk assessment, terrestrial non-target organisms were assumed to occupy areas immediately adjacent to treatment sites. The exposure pathways analyzed for terrestrial vertebrate wildlife included dietary uptake of food items directly treated with the pesticide at the time of application to the treated field. Exposures were calculated on a dietary basis alone. Dose-based exposures were not considered due to no evidence of acute oral toxicity. Accumulation from soil to plants or animal food sources was not considered in this risk assessment. The very low octanol/water partitioning coefficient (log K_{ow} =2.90) suggested that bioaccumulation is not likely. Inhalation of vapor phase pesticide was not considered. The low vapor pressure of the parent compound (6.3 x 10^{-12} PA) suggested that the pesticide does not readily volatilize and the rat acute inhalation LC50: >5.1 mg/L suggests that what little material that would volatilize would not be of significant toxicity. Dermal exposure for terrestrial vertebrates was not considered quantitatively. The low octanol/water partitioning coefficient suggested little potential to cross the dermal barrier, a conclusion supported by the demonstrated low dermal acute toxicity in the rat (LD50: >5000 mg/kg).

Other routes of exposure for terrestrial wildlife that are possible but not considered include drinking water exposure, inhalation of pesticide associated with suspended soil particulate, inhalation of spray droplets, and oral ingestion of soil particles through incidental contact while feeding and preening.

Terrestrial plant exposures considered potentially complete for this pesticide include exposure of vegetation adjacent to treatment sites via drift, sheet flow runoff, and runoff to drainage channels. Drift exposures were considered important to effects measures involving direct application to leaf surfaces. Drift and runoff exposures were also comparable to effects endpoints associated with application of pesticide to soil.

Dietary exposures for terrestrial vertebrates were estimated using the T-REX model version 1.3.1. The exposure endpoint for terrestrial vertebrates from the T-REX model's output corresponded to an upper bound single day peak concentration of pesticide in each of four generalized dietary items. These pesticide concentration estimates were then used for either direct comparison with dietary effects endpoints or first converted to daily oral dose estimates for feeding wildlife and then compared to daily dose effects endpoints.

For terrestrial vertebrate risks the T-REX model was used with an assumption of a maximum 0.5 lb ai/acre single application rate. This is the highest application rate from the proposed labels. The assumption of a single maximum application at the labeled crop

limit also allowed for consideration of the potential for systemic uptake of the pesticide.

For the purposes of the risk assessment aquatic non-target organisms were assumed to occupy a surface water body immediately adjacent to treatment sites. The likely pathways for introduction of the chemical stressor to this aquatic water body include:

- direct deposition of applied product through spray drift
- mass transport of chemical stressor dissolved in run-off from the treated field, and
- mass transport of chemical stressor adsorbed to eroded solids from the treated field.

Once pesticide enters the receiving waters, exposure is likely most significant through absorption of dissolved pesticide from the water column or interstitial water across the gill, integument, and perhaps the gut of the organism. Food chain exposures were not considered to be significant for this pesticide because chlorantraniliprole has a low fish bioconcentration factor of <21.

For estimating exposures of aquatic organisms to chlorantraniliprole, the risk assessment used the PRZM/EXAMS modeling shell (PE5V01). Inputs for this model are presented in Table 17. The screening risk assessment used estimates of the dissolved concentration of the pesticide over a single day, 21-day, and 60-day averaging periods and the exposure measurement point was that averaging period corresponding to a one in ten year return frequency for estimating exposure to water column dwelling organisms. This modeling effort focused on aerial and ground applications only, chemigation and injection were not included specifically as there was not adequate modeling scenarios. It is expected that over the top aerial and ground applications are adequate to represent injection and chemgation. The risk assessment used this approach, although the results are likely to be overestimates of exposure for such a stable compound as chlorantraniliprole because the model used up to 36 years of application events.

Table 16. PRZM/EXAMS Input Parameters For Chlorantraniliprole

Data	Units	Value	Comments
Molecular Weight	g/mole	483.15	
Solubility	mg/L	1.023	
Vapor Pressure	Torr	1.57E-13	
Henrys Constant	atm m^3/mol	3.1E-15	Calculated via solubility and vapor pressure
Hydrolysis @ pH 7	Days	Stable	
Photodegradation in Water	days	0.31	
Aerobic Soil Metabolism	Days	631.76[2,3]	Calculated 90th percentile of mean[1] Mean= 509 days SD= 252 days *t*= 1.40

			n= 9 *Several reported half-lives in MRID 46889124 were not used because of poor fit with first-order degradation model
Aerobic Aquatic Metabolism	Days	341.13	Calculated 90th percentile of mean[1] Mean= 178 days SD= 74.95 days *t*= 3.078 n=2
Anaerobic Aquatic Metabolism	Days	208	Value represents single half-life value[4]
Soil:Water Coefficient (K_{oc})	L/g	328	Average K_{oc}

Risk to Terrestrial Animals-

Risks of direct effects to terrestrial vertebrates are below Agency screening levels of concern.

Aquatic to Animals-

Risks of direct effects to freshwater fish and amphibians and estuarine/marine fish are below Agency screening levels of concern.

Risk to Non-Target Insects-

Terrestrial

Chlorantraniliprole has the potential to produce direct adverse effects in some non-target terrestrial insect species. It appears from the effects data that sensitivity to the pesticide is quite varied among tested invertebrates. If species specific risk assessment becomes necessary (e.g., assessment of a federally listed threatened or endangered species) it is recommended that closer evaluation of the potential representation of the invertebrate data set for a specific organism be considered.

Aquatic

Tables 17 – 18 present the conclusions of the risk assessment for freshwater invertebrates. Acute concerns are triggered by freshwater invertebrate RQ values for every exposure scenario modeled (except for ground spray for the Oregon apple and California turf scenarios, which involve lower rainfall assumptions and thus lower estimates of aquatic exposure). These concerns are limited primarily to acute effects to listed species and restricted use considerations.

Chronic freshwater invertebrate risk concerns were identified for proposed uses on Florida peppers (ground or aerial spray), Florida cucumbers (ground or aerial spray),

California nursery (ground spray), Florida nursery (ground spray), and Tennessee nursery (ground spray). In all cases the RQs were less than an order of magnitude above the Agency concern level. These chronic endpoints are calculated using the most sensitive chronic NOEC for daphnids (4.47 ug/L ug/L).

Table 17. Tier II RQs for FW Invertebrates from Aerial Spray Application of DPX-E2Y45 for Various Crop Types

Scenario	Application			Peak	21-day Average	Acute[1] RQ	Chronic[2] RQ	Identified Concerns
	Rate (lbs/A)	#	Int (days)					
FL cabbage	0.065	3	3	2.652	2.146	0.1850	0.4801	RU,LS
FL cucumber	0.065	3	5	5.693	4.939	0.4258	1.1049	RU,LS, Chronic
PA tomato	0.098	2	5	1.513	1.306	0.1126	0.2922	RU,LS
CA tomato	0.098	2	5	1.080	0.922	0.0795	0.2063	LS
FL tomato	0.098	2	5	3.660	3.001	0.2587	0.6714	RU,LS
FL peppers	0.098	2	5	6.749	5.683	0.4899	1.2714	RU,LS Chronic
CA lettuce	0.065	3	3	3.579	2.997	0.2584	0.6705	RU,LS
CA cotton	0.099	2	5	1.785	1.576	0.1359	0.3526	RU,LS
NC cotton	0.099	2	5	3.730	3.207	0.2765	0.7174	RU,LS
MS cotton	0.099	2	5	3.769	3.271	0.2820	0.7318	RU,LS
NY grape	0.099	2	7	1.389	1.197	0.1032	0.2678	RU,LS
CA grape	0.099	2	7	1.188	1.026	0.0884	0.2295	LS
NC apple	0.099	2	10	1.359	1.153	0.0994	0.2579	LS
PA apple	0.099	2	10	1.245	1.091	0.0941	0.2441	LS
OR apple	0.099	2	10	0.786	0.674	0.0581	0.1508	LS
ID potato	0.066	3	5	1.021	0.859	0.0741	0.1922	LS
ME potato	0.066	3	5	1.558	1.392	0.1200	0.3114	RU,LS
GA peach	0.099	2	7	1.086	0.886	0.0764	0.1982	LS
MI Cherry	0.099	2	7	1.035	0.907	0.0782	0.2029	LS

1-Acute Toxicity Endpoint= 11.6 µg/L
2-Chronic Toxicity Endpoint= 4.47 µg/L
* RQ = EEC/toxicity endpoint
** Acute RQs compared with acute LOCs for non listed species (0.5), restricted use (0.1), and listed species (0.05). Chronic RQs compared with chronic LOC of 1.

Table 18. Tier II RQs for FW Invertebrates from Ground Spray Application of DPX-E2Y45 for Various Crop Types

Scenario	Application			Peak	21-day Average	Acute[1] RQ	Chronic[2] RQ	Identified Concerns
	Rate (lbs/A)	#	Int					
FL cabbage	0.065	3	3	2.531	2.045	0.1763	0.4575	RU,LS
FL cucumber	0.065	3	5	5.624	4.86	0.4190	1.0872	RU,LS, Chronic
PA tomato	0.098	2	5	1.280	1.097	0.0946	0.2454	LS
CA tomato	0.098	2	5	0.731	0.619	0.0534	0.1385	LS
FL tomato	0.098	2	5	3.436	2.817	0.2428	0.6302	RU,LS
FL peppers	0.098	2	5	6.501	5.475	0.4720	1.2248	RU,LS, Chronic
CA lettuce	0.065	3	3	3.311	2.781	0.2397	0.6221	RU,LS
CA cotton	0.099	2	5	1.470	1.28	0.1103	0.2864	RU,LS
NC cotton	0.099	2	5	3.473	2.995	0.2582	0.6700	RU,LS
MS cotton	0.099	2	5	3.575	3.116	0.2686	0.6971	RU,LS
NY grape	0.099	2	7	1.189	1.025	0.0884	0.2293	LS

CA grape	0.099	2	7	0.813	0.706	0.0609	0.1579	LS
NC apple	0.099	2	10	0.999	0.852	0.0734	0.1906	LS
PA apple	0.099	2	10	1.048	0.898	0.0774	0.2009	LS
OR apple	0.099	2	10	0.410	0.365	0.0315	0.0817	None
ID potato	0.066	3	5	0.812	0.68	0.0586	0.1521	LS
ME potato	0.066	3	5	1.350	1.195	0.1030	0.2673	RU,LS
GA peach	0.099	2	7	0.763	0.62	0.0534	0.1387	LS
MI Cherry	0.099	2	7	0.867	0.739	0.0637	0.1653	LS
FLTurf	0.26	2	**7**	0.837	0.707	0.0609	0.1582	LS
PA Turf	0.26	2	**7**	1.102	0.985	0.0849	0.2204	LS
CA Turf	0.26	2	**7**	0.654	0.554	0.0478	0.1239	None
CA Nursery	0.4992	1	NA	5.663	4.672	0.4028	1.0452	RU,LS, Chronic
CA Residential	0.4992	1	NA	1.779	1.543	0.1330	0.3452	RU,LS
FL Nursery	0.4992	1	NA	9.785	8.136	0.7014	1.8201	RU,LS, Chronic
MI Nursery	0.4992	1	NA	2.508	2.284	0.1969	0.5110	RU,LS
TN Nursery	0.4992	1	NA	10.981	9.126	0.7867	2.0416	RU,LS, Chronic

1-Acute Toxicity Endpoint=11.6 µg/L
2-Chronic Toxicity Endpoint= 4.47 µg/L
3-(RU) Restricted Use
4-(LS) Listed Species
* RQ = EEC/toxicity endpoint
** Acute RQs compared with acute LOCs for non listed species (0.5), restricted use (0.1), and listed species (0.05). Chronic RQs compared with chronic LOC of 1.

Estuarine/Marine

Risks to estuarine/marine invertebrates that exceed Agency concern levels are confined to the following Tier II modeling scenarios: Florida cabbage (aerial or ground spray), Florida cucumber (aerial or ground spray), Florida peppers (aerial or ground spray), Florida tomatoes (aerial spray), California lettuce (ground and aerial spray), North Carolina cotton (aerial or ground spray), Mississippi cotton (aerial or ground spray) California nursery (ground spray), Tennessee nursery (ground spray), Florida nursery (ground spray), and Mississippi nursery (ground spray). These risks are generally limited to acute effects to listed species. However, the restricted use LOCs are exceeded for the Florida vegetable scenarios (cucumber, peppers) and nursery use scenarios (California nursery, Tennessee nursery, and Florida nursery scenarios).

Table 19. Tier II RQs for Estuarine/Marine Invertebrates from Aerial Spray Application of DPX-E2Y45 for Various Crop Types

Scenario	Application			Peak	21-day Average	Acute[1] RQ	Chronic[2] RQ	Identified Concerns
	Rate (lbs/A)	#	Int					
FL cabbage	0.065	3	3	2.652	2.146	0.0538	0.0894	LS
FL cucumber	0.065	3	5	5.693	4.939	0.1238	0.2058	RU,LS
PA tomato	0.098	2	5	1.513	1.306	0.0327	0.0544	None
CA tomato	0.098	2	5	1.080	0.922	0.0231	0.0384	None
FL tomato	0.098	2	5	3.660	3.001	0.0752	0.1250	LS
FL peppers	0.098	2	5	6.749	5.683	0.1424	0.2368	RU,LS
CA lettuce	0.065	3	3	3.579	2.997	0.0751	0.1249	LS
CA cotton	0.099	2	5	1.785	1.576	0.0395	0.0657	None
NC cotton	0.099	2	5	3.730	3.207	0.0804	0.1336	LS
MS cotton	0.099	2	5	3.769	3.271	0.0820	0.1363	LS
NY grape	0.099	2	7	1.389	1.197	0.0300	0.0499	None
CA grape	0.099	2	7	1.188	1.026	0.0257	0.0428	None

NC apple	0.099	2	10	1.359	1.153	0.0289	0.0480	None
PA apple	0.099	2	10	1.245	1.091	0.0273	0.0455	None
OR apple	0.099	2	10	0.786	0.674	0.0169	0.0281	None
ID potato	0.066	3	5	1.021	0.859	0.0215	0.0358	None
ME potato	0.066	3	5	1.558	1.392	0.0349	0.0580	None
GA peach	0.099	2	7	1.086	0.886	0.0222	0.0369	None
MI Cherry	0.099	2	7	1.035	0.907	0.0227	0.0378	None

1-Acute Toxicity Endpoint= 39.9 µg/L
2-Chronic Toxicity Endpoint= 24 µg/L
* RQ = EEC/toxicity endpoint
** Acute RQs compared with acute LOCs for non listed species (0.5), restricted use (0.1), and listed species (0.05). Chronic RQs compared with chronic LOC of 1.

Table 20. Tier II RQs for Estuarine/Marine Invertebrates from Ground Spray Application of DPX-E2Y45 for Various Crop Types

Scenario	Application			Peak	21-day Average	Acute[1] RQ	Chronic[2] RQ	Identified Concerns
	Rate (lb/A)	#	Int					
FL cabbage	0.065	3	3	2.531	2.045	0.0513	0.0852	LS
FL cucumber	0.065	3	5	5.624	4.86	0.1218	0.2025	RU,LS
PA tomato	0.098	2	5	1.280	1.097	0.0275	0.0457	None
CA tomato	0.098	2	5	0.731	0.619	0.0155	0.0258	None
FL tomato	0.098	2	5	3.436	2.817	0.0706	0.1174	None
FL peppers	0.098	2	5	6.501	5.475	0.1372	0.2281	RU,LS
CA lettuce	0.065	3	3	3.311	2.781	0.0697	0.1159	LS
CA cotton	0.099	2	5	1.470	1.28	0.0321	0.0533	None
NC cotton	0.099	2	5	3.473	2.995	0.0751	0.1248	LS
MS cotton	0.099	2	5	3.575	3.116	0.0781	0.1298	LS
NY grape	0.099	2	7	1.189	1.025	0.0257	0.0427	None
CA grape	0.099	2	7	0.813	0.706	0.0177	0.0294	None
NC apple	0.099	2	10	0.999	0.852	0.0214	0.0355	None
PA apple	0.099	2	10	1.048	0.898	0.0225	0.0374	None
OR apple	0.099	2	10	0.410	0.365	0.0091	0.0152	None
ID potato	0.066	3	5	0.812	0.68	0.0170	0.0283	None
ME potato	0.066	3	5	1.350	1.195	0.0299	0.0498	None
GA peach	0.099	2	7	0.763	0.62	0.0155	0.0258	None
MI Cherry	0.099	2	7	0.867	0.739	0.0185	0.0308	None
FLTurf	0.26	2	7	0.837	0.707	0.0177	0.0295	None
PA Turf	0.26	2	7	1.102	0.985	0.0247	0.0410	None
CA Turf	0.26	2	7	0.654	0.554	0.0139	0.0231	None
CA Nursery	0.4992	1	NA	5.663	4.672	0.1171	0.1947	RU,LS
CA Residential	0.4992	1	NA	1.779	1.543	0.0387	0.0643	None
FL Nursery	0.4992	1	NA	9.785	8.136	0.2039	0.3390	RU,LS
MI Nursery	0.4992	1	NA	2.508	2.284	0.0572	0.0952	LS
TN Nursery	0.4992	1	NA	10.981	9.126	0.2287	0.3803	RU,LS

1-Acute Toxicity Endpoint=39.9 µg/L
2-Chronic Toxicity Endpoint= 24 µg/L
* RQ = EEC/toxicity endpoint
** Acute RQs compared with acute LOCs for non listed species (0.5), restricted use (0.1), and listed species (0.05). Chronic RQs compared with chronic LOC of 1.

Risk to Plants-

Risks of direct effects to terrestrial and aquatic plants are below Agency screening levels of concern.

Risk to Endangered Species

The following table summarizes the conclusions of potential concerns for direct and indirect effects to federally-listed threatened and endangered species (listed species).

Table 21. Potential Effects to Federally Listed Taxa

Listed Taxa	Direct Effects	Scenario Identified as of Concern	Indirect Effects	Scenario Identified as of Concern
Terrestrial and semi-aquatic plants - monocots	Yes[4]		Yes[1]	all
Terrestrial and semi-aquatic plants - dicots	Yes[4]		Yes[1]	all
Terrestrial invertebrates	Yes	all	No	
Birds	No		Yes[1,2,3,5]	All
Terrestrial phase amphibians	No		Yes[1,2,5]	All
Reptiles	No		Yes[1,2,3,5]	All
Mammals	No		Yes[1,2,3,5]	All
Aquatic vascular plants	No		No	
Freshwater fish	No		Yes[2,5]	All
Aquatic phase amphibians	No		Yes[2,5]	All
Freshwater crustaceans	Yes	All except CA turf (ground spray) and OR apple (ground spray)	Yes[2,5]	All
Mollusks	Yes(may be subject to further evaluation)	All except CA turf (ground spray) and OR apple (ground spray)	Yes[2,5]	All
Marine/estuarine fish	No		Yes[3]	FL cabbage, FL cucumber, FL pepper, NC cotton, MS cotton, CA lettuce, CA nursery, FL nursery, MI nursery, TN nursery
Marine/estuarine invertebrates	Yes	FL cabbage, FL cucumber, FL pepper, NC cotton, MS cotton, CA lettuce, CA nursery, FL nursery, MI nursery, TN nursery	No	

6. REGULATORY POSITION AND RATIONALE

Available data provide adequate information to support the unconditional registration of chlorantraniliprole technical and end-use products on crops and turf grass and ornamentals.

Labeling Restrictions:

General Statements-

"Do not apply directly to water. Drift and runoff may be hazardous to aquatic organisms in water adjacent to use sites."

Surface Water Advisory-

"This product may contaminate water through runoff. This product has a high potential for runoff for several months or more after application. Poorly draining soils and soils with shallow water tables are more prone to produce runoff that contains this product. A level, well-maintained vegetative buffer strip between areas to which this product is applied and surface water features such as ponds, streams, and springs will reduce the potential for contamination of water from runoff. Runoff of this product will be reduced by avoiding applications when rainfall is forecasted to occur within 48 hours."

Ground Water Advisory-

"This chemical has properties and characteristics associated with chemicals detected in ground water. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in ground-water contamination."

Non-Target Organism Advisory-

"This pesticide is toxic to aquatic invertebrates, oysters, and shrimp."

Directions for Use-

Since the residue data for pome fruit reflect spray volumes of 100 gallons per acre, the use directions for pome fruit should be revised to state "minimum spray volume of 100 gal/A (ground)." Also, as there are inadequate residue data that reflect use of adjuvants in end-use products in the residue field trials, the proposed labels should be revised to delete the use of adjuvants on all crops except *Brassica* crops. In the absence of residue data on crops grown in greenhouses, the label should prohibit use on crops grown in greenhouses. Given the results of the confined accumulation and limited field accumulation in rotational crops study, a restriction should be imposed on the proposed labels to prohibit the rotation to any crop not on the label.

7. REDUCED RISK CLASSIFICATION

On April 3, 2007, the Reduced Risk Committee categorized chlorantraniliprole as a "reduced risk" pesticide when used on apple, lettuce, peach, pear, tomato and turf. The Committee noted that chlorantraniliprole's mammalian toxicity risk profile and ecotoxicity profile compared favorably with many of the registered alternatives. Since a reduced risk classification was granted, a public interest finding was not conducted.

Chlorantraniliprole is expected to be a major alternative to azinphos-methyl for apples and pears. It is also expected to be an alternative to phosmet for these same crops

and an alternative to pyrethroids for vegetables.

8. CONTACT PERSON AT EPA

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DISCLAIMER: The information presented in this Pesticide Fact Sheet is for informational purposes only may not be used to fulfill data requirements for pesticide registration and reregistration. The information is believed to be accurate as of the date on the document.

APPENDIX I

GLOSSARY OF TERMS AND ABBREVIATIONS

ADNT	Acute delayed neurotoxicity

a.i.	Active Ingredient
aPAD	Acute Population Adjusted Dose
ARI	Aggregate Risk Index
BCF	Bioconcentration Factor
CAS	Chemical Abstracts Service
ChE	Cholinesterase
ChEI	Cholinesterase inhibition
cPAD	Chronic Population Adjusted Dose
%CT	Percent crop treated
DAT	Days after treatment
DEEM-FCID	Dietary Exposure Evaluation Model - Food Consumption Intake Database
DNA	Deoxyribonucleic acid
DNT	Developmental neurotoxicity
DIT	Developmental immunotoxicity
DWLOC	Drinking Water Level of Comparison.
EC	Emulsifiable Concentrate Formulation
EEC	Estimated Environmental Concentration. The estimated pesticide concentration in an environment, such as a terrestrial ecosystem.
EPA	U.S. Environmental Protection Agency
FQPA	Food Quality Protection Act
GLC	Gas Liquid Chromatography
GLN	Guideline Number
LC_{50}	Median Lethal Concentration. A statistically derived concentration of a substance that can be expected to cause death in 50% of test animals. It is usually expressed as the weight of substance per weight or volume of water, air or feed, e.g., mg/l, mg/kg or ppm.
LD_{50}	Median Lethal Dose. A statistically derived single dose that can be expected to cause death in 50% of the test animals when administered by the route indicated (oral, dermal, inhalation). It is expressed as a weight of substance per unit weight of animal, e.g., mg/kg.
LOAEL	Lowest Observed Adverse Effect Level
LOAEC	Lowest Observed Adverse Effect Concentration
LOC	Level of Concern
LOD	Limit of Detection
LOQ	Limit of Quantitation
mg/kg/day	Milligram Per Kilogram Per Day
mg/L	Milligrams Per Liter
MOE	Margin of Exposure

MRID	Master Record Identification (number), EPA's system of recording and tracking studies submitted
MTD	Maximum tolerated dose
NA	Not Applicable
NOEC	No Observable Effect Concentration
NOEL	No Observed Effect Level
NOAEL	No Observed Adverse Effect Level
NOAEC	No Observed Adverse Effect Concentration
NPDES	National Pollutant Discharge Elimination System
OP	Organophosphate
OPP	EPA Office of Pesticide Programs
OPPTS	EPA Office of Prevention, Pesticides and Toxic Substances
PAD	Population Adjusted Dose
PAG	Pesticide Assessment Guideline
PAM	Pesticide Analytical Method
PHED	Pesticide Handler's Exposure Data
PHI	Preharvest Interval
ppb	Parts Per Billion
PPE	Personal Protective Equipment
ppm	Parts Per Million
PRZM/EXAMS	Tier II Surface Water Computer Model
RAC	Raw Agriculture Commodity
RBC	Red Blood Cell
RED	Reregistration Eligibility Decision
REI	Restricted Entry Interval
RfD	Reference Dose
SCI-GROW	Tier I Ground Water Computer Model
SF	Safety Factor
TGAI	Technical Grade Active Ingredient
UF	Uncertainty Factor
µg	micrograms
µg/L	Micrograms Per Liter
µL/g	Microliter per gram
USDA	United States Department of Agriculture
WPS	Worker Protection Standard

APPENDIX II

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