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

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: DPX-L5300 Registration Standard Update

FROM: James W. Akerman, Chief
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Environmental Fate & Effects Division (H7507C)

TO: Larry Schnabelt, PM 23
Fungicide-Herbicide Branch
Registration Division (H7505C)

Attached are the Disciplinary Review, Topical Summary, and Data Requirements for the Updated Ecological Effects Chapter of the DPX-L5300 Registration Standard.

John Noles 3/29/89 John Noles, Biologist
Ecological Effects Branch

cc: J. Heckman (MSS - Memorandum)
A. Rispin (SIS)

DPX-L5300

Ecological Effects Topical Summaries

Effects on Birds

Three studies in one document were evaluated under this topic. The studies are acceptable for use in a hazard assessment.

Author	Date	Fiche ID No.
Beavers et al.	1984	JLNDPX01

In order to establish the toxicity of DPX-L5300 to birds, the following tests are required using the technical material:

- Two avian dietary studies on one species of waterfowl (preferably the mallard) and on one species of upland game bird (preferably the bobwhite or other native quail or the ring-necked pheasant);
- One avian single-dose oral study on one species used in the avian dietary studies (preferably the mallard or bobwhite).

Avian oral and dietary toxicity tests are required to support registration of an end-use product intended for outdoor application, and to support registration of a manufacturing-use product which may be used to make such an end-use product. These studies are also required, on a case-by-case basis, to support the registration of an end-use product intended solely for indoor application, and to support registrations of manufacturing-use products which may be used to make such an end-use product.

Avian Acute Oral Toxicity

The acceptable acute oral toxicity data for use in a hazard assessment are listed below.

Species	% ai	LD_{50} (mg/kg)	Author	Date	Fiche ID No.	Fulfills Requirement
Bobwhite quail	96.8	> 2250	Beavers et al.	1984	JLNDPX01	Yes

The data indicate that technical DPX-L5300 is practically nontoxic to waterfowl. The data is considered scientifically sound and fulfills the Guideline requirement for an avian acute oral study.

Avian Acute Dietary Toxicity

Two studies were available for review under this topic and were acceptable for use in making hazard assessments.

Species	% ai	LC_{50}	Author	Date	Fiche ID No.	Fulfills Requirement
Mallard duck	96.8	> 5620 ppm	Beavers et al.	1984	JLNDPX01	Yes
Bobwhite quail	96.8	> 5620 ppm	Beavers et al.	1984	JLNDPX01	Yes

The studies' results indicate that DPX-L5300 is practically nontoxic to avian species. These studies fulfill the Guideline requirements for avian acute dietary toxicity.

Avian Precautionary Labeling

Based on the results of the acute avian studies, precautionary labeling for avian species will not be required.

Effects on Freshwater Fish

Two studies from one document were evaluated under this topic. These two studies were acceptable for use in a hazard assessment.

Author	Date	Fiche ID No.
DuPont	1986	JLNDPX01

The minimum data required for establishing the acute toxicity of DPX-L5300 to fish are the results from two 96-hour studies with the technical-grade material. The studies should be conducted with one coldwater species (preferably rainbow trout) and one warmwater species (preferably bluegill sunfish).

Technical DPX-L5300

The fish acute toxicity data that are acceptable for use in a hazard assessment are listed below:

Species	% ai	(ppm)	Author	Date	Fiche ID No.	Fulfills Requirement
Bluegill sunfish	96.8	> 1000	DuPont	1986	JLNDPX01	Yes
Rainbow	96.8	> 1000	DuPont	1986	JLNDPX01	Yes

There is sufficient information available to characterize technical DPX-L5300 as practically nontoxic to coldwater and warmwater freshwater fishes.

Precautionary Labeling

Based upon the available data derived from the freshwater fish acute studies with the technical grade, precautionary statements for fish will not be required.

Effects on Freshwater Invertebrates

The minimum data required for establishing the acute toxicity of DPX-L5300 to freshwater invertebrates are the results from a 48-hour with study with the technical material (preferably on first instar (Daphnia magna or early instar amphipods, stone flies, or may flies). The study is required to support registration of manufacturing-use pesticide products and enduse products intended for outdoor application.

One study in one document was evaluated under this topic and was found to be acceptable for use in making hazards assessments.

Species	% ai	LC_{50} (ppm)	Author	Date	Fiche ID No.	Fulfills Requirements
Daphnia	96.8	720	DuPont	1984	JLNDPX01	Yes

The Guideline requirement for the technical grade acute testing on aquatic invertebrates has been satisfied.

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Precautionary Labeling

Based upon the available data, precautionary statements for aquatic invertebrates will not be required.

Plant Protection

No studies were evaluated under this topic.

Phytotoxicity testing is required on a case-by-case basis. In certain cases, data are required for pesticides to be used in forests and natural grasslands, when phytotoxicity problems arise, and when the product may pose hazards to endangered or threatened plant species. There are no available reports or data to indicate that the herbicidal nature of DPX-L5300 poses any problems to such species. DPX-L5300 uses are for terrestrial food crop uses.

The Guideline requirement for plant protection does not require fulfillment at this time and shall be reserved until sufficient vapor pressure information becomes available and possible concerns are raised. The registrant will be required to submit phytotoxicity information collected from its experimental use permit program previously conducted to support the use patterns.

Special Testing: Residue Monitoring

The residue monitoring requirement shall be reserved until sufficient environmental fate data become available and if degradation toxicity becomes a concern.

I. ECOLOGICAL EFFECTS PROFILE

A. Manufacturing Use - DPX-L5300

1. Avian Studies

Based upon the available data for hazard assessment, technical DPX-L5300 is practically nontoxic to birds on an acute oral and dietary basis. Acute single dose oral LD_{50} values to bobwhite quail were determined to be greater than 2250 mg/kg (Beavers, 1984, JLNDPX01). The acute dietary LC_{50} values for mallards and bobwhite quail were determined to be greater than 5620 ppm for both species (Beavers, 1984, JLNDPX01).

2. Aquatic Studies

Based upon the available data, technical DPX-L5300 is practically nontoxic to rainbow trout and bluegill

sunfish as LC_{50} values for each were greater than 1000 ppm (DuPont, 1986, JLNDPX01). The technical material is also practically nontoxic to aquatic invertebrates, as demonstrated by Daphnia magna LC_{50} = 720 ppm (DuPont, 1984, JLNDPX01).

3. Plant Protection

No reports or studies were available for evaluation under this topic. Phytotoxicity data from from the previous experimental use permit program will be required to determine if data requirements are necessary.

II. FORMULATIONS AND USE

DPX-L5300 is a selective contact herbicide recommended for use on wheat (including durum) and barley. DPX-L5300 provides postemergence control of certain actively-growing broadleaf weeds. The single active ingredient formulation consists of a 75% dry flowable. Recommended application rates are 1/6 to 1/3 oz of formulated product per acre (0.125-0.25 oz ai/A). The recommended application periods are postemergent to the crop (after the crop is in the two-leaf stage, but before the boot stage); applications may be made by ground or air equipment.

III. ENVIRONMENTAL FATE

The following information was excerpted from EAB's Science Chapter (Termes, May 2, 1988):

Although not all data requirements have been fulfilled and, therefore, the available data are insufficient to fully assess the environmental fate of DPX-L5300, the following general patterns have been observed:

a) Solubility and persistence increases with increasing pH.

   Hydrolysis studies indicate a half-life < 1 day at pH 5; at pH 7, half-life is 3 to 6 days; at pH 9, after 32 days, 87 to 95 percent of parent compound remained intact.

b) Degradation (on soils and in aqueous media) increases with decreasing pH.

c) The most important degradation pathway of DPX-L5300 involves cleavage of the sulfonylurea bridge to produce degradates containing the triazine or the phenyl ring alone.

d) The main degradation product containing the triazine ring is triazine amine, (4-methyl-N,6-dimethyl-1,3,5-triazin-2-amine).

e) "Sulfonamide" (methyl 2-(aminosulfonyl) benzoate) is the first degradation product containing the phenyl ring that forms. Sulfonamide can then be converted to "acid sulfonamide" (2-(aminosulfonyl) benzoic acid), which then can form saccharin (1,2-benziothiazol-3(2H)-one, 1,1-dioxide).

f) The physicochemical characteristics of soils influence the degradation and leaching behavior.

g) Degradates containing the phenyl ring alone appear to be more mobile than the triazine amine (based on column leaching studies).

Note that saccharin is a major degradate of DPX-L5300, which has been detected in soil, leachates, and plant material. Saccharin has been classified as a carcinogen.

A recent March 10, 1988, leaching assessment for Harmony (another sulfonylurea herbicide) and its degradates by the Ground Water Team addressed the potential leaching problem of sulfonylureas as a class of compounds. Based on the recommendations suggested for Harmony, the following is applicable to DPX-L5300:

a) The toxicological levels of parent DPXL5300 (Express) and main degradates should be established.

b) Methods of detection of sulfonylureas and degradates at low levels (1 ppb or less) should be developed. These would be the levels expected in ground water and, therefore, such methods will be necessary for any ground-water monitoring studies.

c) Ground-water monitoring studies, either prospective or retrospective, should be considered in the future.

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HAZARD EVALUATION

Hazards to Terrestrial Organisms

The previous experimental use permit program for DPX-L5300 indicated the following target organisms or undesirable plants:

Black mustard	Brassica nigra
bushy wallflower (treacle mustard)	Erysimum repandum
Canada thistle	Cirsium arvense
coast fiddleneck	Amsinckia intermedia
common chickweed	Stellaria media
conical catchfly	Silene conica
corn gromwell	Lithospermum
dog fennell	Eupatorium capifclium
field pennycress	Thlaspi arvense
flixweed	Descurainia sophia
henbit	Lamium amplexicaule
kochia	Kochia scoparia
lambsquarter (common, slimleaf)	Chenopodium album C. leptophyllum
London rocket	Sisymbrium irio
miner's lettuce	Claytonia perfoliata
prickly lettuce	Lactuca serriola
purple mustard	Chorispora tenella
Russian thistle	Salsola kali var. tenuifolia shepherd's purse
	Capsella bursa-pastoris
smallseed falseflax	Camelina microcarpa
stinking mayweed	Anthemus cotula
tansy mustard	Descurainia pinnata
tarweed fiddleneck	Amsinckia tycopsoides
tumble mustard (Jim Hill)	Sisymbrium altissimum
wild mustard	Sinapis arvense

The control of the above plant species in wheat and barley fields requires an application rate of 1/6 to 1/3 oz of formulated product per acre (0.008 to 0.016 lb ai/A). The following maximum EECs of DPX-L5300 on vegetation and insects were derived using the methods of Hoerger and Kenaga (1972) and Kenega (1973). The estimates are based upon the maximum application rate.

Short rangegrass	3.84 ppm
Long grass	1.76 ppm
Leaves, leafy crops	2.0 ppm
Forage; small insects	0.93 ppm
Seed pods; large insects	0.19 ppm
Fruit	0.11 ppm
Soil surface (1-inch)	0.35 ppm

The residue levels are far below the minimum acute levels established for avian species at greater 5620 ppm. Therefore, exposure to acute levels are not anticipated. Chronic hazard is not expected due to low rates at a single application. The hazards to mammalian species also cannot be assessed because of the present lack of data.

Hazards to Aquatic Organisms

Exposure to aquatic organisms from field applications can be realized through runoff, aerial drift, and soil leaching. Environmental fate studies have identified sulfonamide, triazine amine, and saccharin as the major degradation products that can be available for exposure to aquatic organisms.

The following are aquatic EECs that are expected following ground and aerial applications. Runoff of 5 percent based upon water solubility is (280 mg/L at pH 6) and drainage from a 10-acre basin into a 1-acre pond.

Ground application runoff:	0.5' depth - 0.59 ppb
	6.0' depth - 0.05 ppb
Aerial application (runoff and drift):	0.5' depth - 0.01 ppb
	6.0' depth - 0.08 ppb

The anticipated residues do not pose acute hazards to aquatic organisms because of the pesticide's demonstrated toxicity levels of 720 ppm for aquatic invertebrates and above 1000 ppm for fish. Although there are no chronic data for aquatic organisms, the exposure levels are far below 0.01 of the acute levels. Consequently, no hazard from chronic exposure is anticipated.

Endangered Species

Endangered species are not expected to be adversely impacted from the proposed use on wheat and barley. The rationale is based upon the low application rate, low EECs, and the demonstrated low toxicity profile. Exposure to endangered species will be considered on a case-by-case basis when additional use patterns are proposed.

Previous cluster analysis and biological opinion evaluations of various pesticide uses on wheat did not indicate jeopardy to endangered plant species. Therefore, EEB does not expect endangered plant species to be at risk from the use of DPX-L5300 on wheat. The submission of phytotoxicity data collected from the experimental use permit program will provide additional information that will enable EEB to evaluate any additional proposed use patterns and the risk to endangered plant species.

ENVIRONMENTAL HAZARDS STATEMENTS FOR DPX-L5300 LABELING

Note: Environmental hazards labeling subject to change pending the review results of required studies to be submitted in response to the Registration Standard.

Manufacturing-Use Products

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

End-Use Products (Terrestrial Food Crop)

> Do not apply directly to water or wetlands (swamps, bogs, marshes, potholes). Do not contaminate water by disposal of equipment washwaters.

TABLE A

GENERIC DATA REQUIREMENTS FOR DPX-L5300

Data Requirement	Test Substance[1]/	Use Pattern[2]/	Does EPA Have Data?	Bibliographic Citation	Must Additional Data be Submitted?	Timeframe for Submission
§158.145 Wildlife and Aquatic Organisms						
SPECIAL TESTING						
70-1 - Residue Monitoring	TEP	A	No		Reserved[3]/	
AVIAN AND MAMMALIAN TESTING						
71-1 - Acute Avian Oral Toxicity	TGAI	A	Yes	JLNDPX01	No	
71-2 - Avian Subacute Dietary Toxicity						
- Upland Game Bird	TGAI	A	Yes	JLNDPX01	No	
- Waterfowl	TGAI	A	Yes	JLNDPX01	No	
71-3 - Wild Mammal Toxicity	TGAI	A	No		No	
71-4 - Avian reproduction						
- Upland Game Bird	TGAI	A	No		No	
- Waterfowl	TGAI	A	No		No	
71-5 - Simulated Field Testing						
- Mammals	TEP	A	No		No	
- Birds	TEP	A	No		No	
- Actual Field Testing						
- Mammals	TEP	A	No		No	
- Birds	TEP	A	No		No	

TABLE A

GENERIC DATA REQUIREMENTS FOR DPX-L5300

Data Requirement	Test Substance	Use Pattern	Does EPA Have Data?	Bibliographic Citation	Must Additional Data be Submitted?	Timeframe for Submission
158.145 Wildlife and Aquatic Organisms (cont'd)						
AQUATIC OEGANISMS TESTING						
72-1 - AcuteToxicity to Freshwater Fish						
- Coldwater Fish Species	TGAI	A	Yes	JLNDPX01	No	
- Warmwater Fish	TGAI	A	Yes	JLNDPX01	No	
72-2 - Acute Toxicity to Freshwater Invertebrates	TGAI	A	Yes	JLNDPX01	No	
72-3 - Acute Toxicity Estuarine and Marine Organisms						
- Fish	TGAI	A	No		No	
- Mollusk	TGAI	A	No		No	
- Shrimp	TGAI	A	No		No	
72-4 - Fish and Early Life Stage and Aquatic Invertebrate Life Cycle						
- Freshwater Species	TGAI	A	No		No	
- Estuarine/Marine Species	TGAI	A	No		No	

TABLE A

GENERIC DATA REQUIREMENTS FOR DPX-L5300

Data Requirement	Test Substance	Use Pattern	Does EPA Have Data?	Bibliographic Citation	Must Additional Data be Submitted?	Timeframe for Submission
158.145 Wildlife and Aquatic Organisms (Cont'd)						
72-5 - Fish Life Cycle	TGAI	A	No		No	
72-6 - Aquatic Organism Accumulation						
- Crustacean			No		No	
- Fish			No		No	
- Insect Nymph			No		No	
- Shrimp			No		No	
72-7 - Simulated Field Testing - Aquatic Organisms	TEP	A	No		No	
- Actual Field Testing - Aquatic Organisms	TEP	A	No		No	

FOOTNOTES:

1/ TGAI = Technical Grade Active Ingredient; TEP = Typical End-Use Producy

2/ A = Terrestrial, Food Crop; B = Terrestrial Nonfood; C = Aquatic, Food Crop; D = Aquatic, Nonfood; E = Greenhouse, Nonfood; G = Forestry; H - Domestic Outdoor; I = Indoor.

3/ The DPX-L5300 Ecological Effects Science Chapter and associated data requirements are currently limited to use on wheat and barley. Future proposals for added uses will require a case-by-case evaluation of hazards and data requirements. Residue monitoring will not be required at the preser time for wheat and barley unless sufficient environmental fate studies determine otherwise.

TABLE A

GENERIC DATA REQUIREMENTS FOR DPX-L5300

I

Data Requirement	Test Substance	Use Pattern	Does EPA Have Data?	Bibliographic Citation	Must Additional Data be Submitted?	Timeframe for Submission
158.150 Plant Protection						
121-1 - TARGET AREA PHYTOTOXICITY	EP	A	No		No 1/	
NONTARGET AREA PHYTOTOXICITY						
TIER I						
122-1 - Seed Germination/ Seedling Emergence	TGAI	A	No		No	
122-1 - Vegetative Vigor	TGAI	A	No		No	
122-2 - Aquatic Plant Growth	TGAI	A	No		No	
TIER II						
123-1 - Seed Germination/ Seedling Emergence	TGAI	A	No		Reserved 2/	
123-1 - Vegetative Vigor	TGAI	A	No		Reserved 2/	
123-2 - Aquatic Plant Growth	TGAI	A	No		Reserved 2/	
TIER III						
124-1 - Terrestrial Field	TEP	A	No		No 1/	
124-2 - Aquatic Field	TEP	A	No		No 1/	

TABLE A

GENERIC DATA REQUIREMENTS FOR DPX-L5300

FOOTNOTES:

1/ These requirements are generally waived unless it is believed there is a phototoxicity problem.

2/ Tier II studies are reserved pending the results of the environmental fate studies. EEB requires the results of drift studies normally required through Environmental Fate and Ground Water Branch (EFGWB). Such studies will allow EEG to conduct phytotoxicity hazard assessments. For exposure to nontarget aquatic plants from application drift.

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TABLE A

DPX-L5300 GENERIC DATA REQUIREMENTS

Data Requirement	Composition 1/	Use Pattern 2/	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA Section 3(c)(2)(B)? Time
§158.150 Plant Protection					
Target Area Phytotoxicity					
121-1 - Target Area Testing	TEP	A	N/A 3/		No
Nontarget Area Phytotoxicity					
TIER I					
122-1 - Seed Germination/ Seedling Emergence	TGAI	A	No		No 4/
122-1 - Vegetative Vigor	TGAI	A	No		No 4/
122-2 - Aquatic Plant Growth	TGAI	A	No		No 4/
TIER II					
123-1 - Seed Germination/ Seedling Emergence	TGAI	A	No		Yes 9 months
123-1 - Vegetative Vigor	TGAI	A	No		Yes 9 months
123-2 - Aquatic Plant Growth	TGAI	A	No		Yes 9 months
TIER III					
124-1 - Terrestrial Field	TEP	A	No		Reserved 5/
124-2 - Aquatic Field	TEP	A	No		Reserved 5/

TABLE A

DPX-L5300 GENERIC DATA REQUIREMENTS

Footnotes

1/ Composition: TGAI = Technical Grade of the Active Ingredient; TEP = Typical End-Use Product.
2/ The use patterns are coded as follows: A = Terrestrial, Food Crop; B = Terrestrial, Nonfood; C = Aquatic, Food Crop; D = Aquatic, Nonfood; E = Greenhouse, Food Crop; F = Greenhouse, Nonfood; G = Forestry; H = Domestic Outdoor; I = Indoor.
3/ Not currently a requirement.
4/ Since this is an herbicide, testing should be conducted at the Tier II level.
5/ Reserved pending results of Tier II plant data and drift studies.