

APPENDIX A

**Summary of Available and Relevant Toxicity Data
from Ecological Risk Assessment Literature
Review for Overdrive®**

Appendix A

Summary of Available and Relevant Toxicity Data from Ecological Risk Assessment Literature Review for Overdrive®

Introduction

A literature review and ecological data evaluation was conducted on nine herbicides that are currently being used or are proposed for use by the Bureau of Land Management (BLM) for vegetation management on 261 million acres of public lands in the Western U.S., including Alaska. The information gathered from this evaluation will be included along with other collected data to derive toxicity reference values for use in the ecological risk assessment (ERA; ENSR 2005). The ERA was conducted in conjunction with the Vegetation Treatments Programmatic Ecological Impact Statement (PEIS) for the BLM. Scientific papers were gathered during this process to provide data on acute and chronic toxicity of selected herbicides to the non-target species. The review process included consideration of U.S. Fish and Wildlife Service (USFWS) draft literature search guidance. The nine herbicides that were investigated during this evaluation were as follows:

- Diflufenzopyr
- Diquat
- Fluridone
- Imazapic
- Sulfometuron-methyl
- Bromacil
- Chlorsulfuron
- Diuron
- Tebuthiuron

This review process was carried out in three tiers: Tier I – Literature search and preliminary review to select individual manuscripts; Tier II – Screening to determine whether the manuscript is acceptable; and Tier III – Thorough review to obtain data for possible toxicity reference value (TRV) use.

After the original literature search was completed, the BLM determined that additional information was needed in order to evaluate the herbicide Overdrive® which is a mixture of diflufenzopyr (21.4%) and dicamba (55.0%), with inert ingredients making up the remaining 23.6%. This report provides information for Overdrive®; the other chemicals are discussed in separate reports. Overdrive® is the brand name of an herbicide produced by BASF Corporation. During the review process for diflufenzopyr – following the tiered approach described above – it was found that some of the data were specific to Overdrive® (also known as Distinct®), and thus could not be considered representative of diflufenzopyr alone. Overdrive® was, therefore, reviewed separately by completing an additional abbreviated search for data that specifically pertained to Overdrive®.

Literature Search Methodology

The literature review process was initiated by conducting a keyword search pertaining to each of the nine chemicals in selected databases. The keyword search for all databases, except for one (Chemical Abstracts/Scifinder Scholar), included the herbicide name but not the commercial name (i.e., some commercial names are common words). The search parameters for Chemical Abstracts consisted of the herbicide name and chemical abstracts service (CAS) registry number. The open literature search was conducted at Colorado State University, Fort Collins, CO. The search period for diflufenzopyr was from 1998 to 2002. The following 12 databases were searched:

- AGRICOLA

- ASFA (Aquatic Sciences and Fisheries Abstracts)
- Biological Sciences
- BIOSIS / Biological Abstracts
- Chemical Abstracts / Scifinder Scholar
- Environmental Science and Pollution Management
- MedLine
- Safety Science and Risk
- Toxline
- Water Resources Abstracts
- Web of Science / Science Citation Index
- Zoological Records

Because the initial literature search included the generic herbicide name as a keyword but not the commercial name, an abbreviated search was conducted using the keywords “Overdrive” and “Distinct.” That search was limited to search engines readily accessible and available through the internet.

All of the documents obtained in the open literature searches were then evaluated by a Senior Toxicologist to select manuscripts pertaining to the specific objectives of this project (Tier I). Relevant studies were those that were judged, to the extent possible while searching literature databases (i.e., relying on title and abstract, when available), to provide useful data for conducting the ERA. Relevant studies contained the following information at a minimum:

- Acute (mortality vs. survival) or chronic (largely growth or reproduction, although other sublethal data—if available—were also considered potentially relevant) toxicity data for the active ingredient.
- Verifiable numeric endpoint values (e.g., LC₅₀, NOEC) that could be used in the risk characterization process.
- Toxicity data for clinical test species (e.g., mice, rats) and species used for screening non-human impacts (all other mammals, birds, invertebrates, algae, plants).
- Field or mesocosm studies were also included, but only if effects from exposure to the single herbicide in question could be identified and separated from other stressors.

Literature that was excluded as part of this initial literature gathering process included:

- analytical chemistry studies;
- methods papers without specific toxicity data;
- modeling studies that contained no empirically-derived data; and
- reviews or reports that were not primary toxicity data sources (except as a source for obtaining primary literature).

These search criteria enhanced the ability to screen scientific papers for the type of toxicity information needed in the ERA. Hard copies of all manuscripts that met these criteria were then obtained for further evaluation. Once articles were obtained, they were incorporated into a comprehensive management database (EndNote®). There were 243 documents identified from this process and obtained for further consideration. The bibliography lists of articles obtained for diflufenzopyr, dicamba, and Overdrive® is included in this report (Appendix A.1).

Literature Review Methodology

A cursory review (Tier II) was performed on each manuscript after a hard copy was obtained. Exclusion and inclusion criteria to determine acceptability for further review were developed prior to the process in conjunction

with the BLM. Manuscripts were excluded that dealt only with the following subjects:

- Human health effects
- Effects on microorganisms: (e.g., fungi, bacteria)
- Genotoxic effects (mutagenic, carcinogenic)
- Bioassays on cells of a whole organism (e.g., rat hepatocytes, rat liver S9)
- Effects on target plants (efficacy testing)
- Non-toxic effects (e.g., fate, transport, leaching, analytical methods)
- Mixtures including herbicides other than the nine being reviewed

In addition, manuscripts that solely included data on marine receptors were originally excluded; however, these data were later included because marine ecosystems could be adjacent to application areas on BLM lands.

Inclusion criteria and rating (on a scale of 1 [weak] to 5 [strong]) of issues that were to be emphasized (requiring a subsequent review step) were as follows:

1. Effects on nontarget receptors related to ERA protocol
2. Chronic, sub-lethal, or reproductive effects that may have adverse effects on populations
3. Effects from inerts, degradates, and metabolites
4. Studies with mixtures that include diflufenopyr and any of the 8 other herbicides (i.e., not containing other herbicides)
5. Indirect effects to food supply or cover

Additional criteria that were used in reviewing papers (reviewers answered ‘Yes’ or ‘No’) are listed below:

- Were the corroborating studies described in sufficient detail (i.e., weight of evidence)?
- Did the study have a proper exposure dose, mechanism, and duration?
- Did the test include proper sample size, statistical analysis, and especially statistical endpoints (e.g., NOAEL, EC₅₀) or dose response curves?
- Were proper controls used and were they acceptable?
- Were the data published in a peer-reviewed journal?

Each of the 243 identified papers was scored on the selection criteria listed above, including documentation of the number of test organisms, statistical analysis, proper use, and performance of controls, and the study was classified as either “adequate” or “not adequate”.

In Tier III, papers that were found to be acceptable for use were evaluated more thoroughly based on criteria developed with the BLM, and in most cases, the following information is included as a second review form page for each manuscript:

- Author(s).
- Date of publication.
- Title of publication.
- Name of publication.
- Herbicide(s) used in the study.
- Receptor category: 20 g mammal, honey bee, 70 kg herbivore, small bird, large bird, non-target plants (monocot and dicot), warmwater fish, coldwater fish, aquatic invertebrate, aquatic plant, aquatic macrophyte). The specific life history stage was also recorded when available.
- Exposure conditions specifying the formulation, concentration, or amount of active ingredient and medium.
- Effect: Acute or sublethal effect end points of product formulations and breakdown products, and/or their component chemicals, such as: larval and embryonic developmental effects, endocrine disruption,

reproductive impairment, changes in behavioral traits such as predator avoidance, feeding/appetite, lethargy or excitement, homing ability, swimming speed, or attraction to or repulsion from the chemicals.

- Toxicity endpoints (e.g., NOAEL, EC₅₀, LC₅₀, or dose response curve).
- Degradates, inerts, if available.
- Ecological conditions of study (e.g., mesocosm, static/flow-through, water quality parameters).
- Comments (e.g., mixture effects: additive, synergistic, or antagonistic effect end points of multiple products, other observations).

The Tier II reviews for diflufenzopyr, Overdrive[®], and Distinct[®] were conducted by only one senior toxicologist, while in the subsequent review process (Tier III), two senior toxicologists independently reviewed papers and determined data adequacy. The reviews were then compiled, and the pertinent information was entered into a master spreadsheet documenting review findings for possible use in TRV derivation. The documents used in this TRV derivation are designated in **bold** in the bibliography (Appendix A.1), and the derivation of TRVs from all available sources is reported in the ERA (ENSR 2005).

Results

There were no papers discovered in the review of the open literature for diflufenzopyr, Overdrive[®] or Distinct[®]; therefore, there were no papers available for Tier II review or incorporation into the TRV derivation (Tables 1 and 2), and subsequently Tier II and III literature review forms were not completed. Additional information on Overdrive[®] was compiled by reviewing a recent draft risk assessment on dicamba completed on behalf of the USDA Forest Service (Syracuse Environmental Research Associates, Inc [SERA] 2003). The toxicity data considered in the USDA report consisted of several literature reviews regarding human health and ecological effects of dicamba, as well as unpublished reports submitted to the USEPA as part of the registration process. Full text copies of relevant studies were provided to the USDA contractor by the USEPA Office of Pesticide Programs and the report provided a review and synopses of the most relevant studies. This information was reviewed for this Overdrive[®] risk assessment, and relevant data was included in the TRV derivation process (see the TRV derivation spreadsheet in Appendix A.2).

TABLE 1

Summary of the Results of the Open Literature Review for Diflufenzopyr

Total number of papers obtained for Diflufenzopyr	0
Total number of papers accepted for Tier II review	0
Total number of papers used in TRV derivation	0

TABLE 2

Summary of the Results of the Open Literature Review for Overdrive[®]/Distinct[®]

Total number of papers obtained for Overdrive [®] /Distinct [®]	0
Total number of papers accepted for Tier II review	0
Total number of papers used in TRV derivation	0

References

- ENSR 2005. Overdrive[®] Ecological Risk Assessment Draft Report. Prepared for the Bureau of Land Management. January 2005.
- Syracuse Environmental Research Associates, Inc (SERA). 2003. Dicamba - Human Health and Ecological Risk Assessment – Peer Review Draft. Prepared for USDA Forest Service, Forest Health Protection. Dated October 31, 2003.

APPENDIX A.1
BIBLIOGRAPHY LIST

Appendix A.1. Dicamba Bibliography List

- Bryant, J. 1993. Letter Sent to R. Taylor Dated May 28, 1993 concerning Acute Avian Testing on Quail and Mallard Ducks. Prepared by Sandoz Agro, Inc. MRID 42794001.
- Crome, S., V. Stuart, and A. Anderson. 1987. Dicamba: Potential Tumorigenic Effects in Prolonged Dietary Administration to Mice: Report No. VCL 72/871205. Unpublished study prepared by Huntingdon Research Centre Ltd. MRID 40872401.
- Cullimore, D.R. 1975. The *In Vitro* Sensitivity of Some Species of Chlorophyceae to a Selected Range of Herbicides. *Weed Research* 15:401-406.
- Davis, R.K., W.P. Jolley, and K.L. Stemmer. 1962. The Feeding for Two Years of the Herbicide 2-Methoxy-3,6-dichlorobenzoic Acid to Rats and Dogs. Unpublished study. MRID 00028248.
- Drench, G. 1986. (Dicamba) One Year Dietary Toxicity Study in Dogs: Laboratory Project I.D.163-696. Unpublished Study Prepared by International Research and Development Corp. MRID 40321102.
- Edson, E.F., and D.M. Sanderson. 1965. Toxicity of the Herbicides 2-methoxy-3,6-dichlorobenzoic Acid (Dicamba) and 2-methoxy-3,5,6-trichlorobenzoic Acid (Tricamba). *Food and Cosmetic Toxicology* 3:299-304.
- Fairchild, J.F., D.S. Ruessler, P.S. Haverland, and A.R. Carlson. 1997. Comparative Sensitivity of *Selenastrum capricornutum* and *Lemna minor* to Sixteen Herbicides. *Archives of Environmental Contamination and Toxicology* 32 (4):353-357.
- Fink, R. 1977a. Acute Oral LD₅₀. Mallard Duck. Banvel Technical. Final Report. Wildlife International Inc. November 3, 1977. Review. Accession No. 232965.
- _____. 1977b. Eight-day Dietary LC₅₀. Bobwhite Quail. Banvel Technical, Final Report. Wildlife International Ltd. November 10, 1977. Review. Accession No. 232965.
- _____. 1977c. Eight-day Dietary LC₅₀. Mallard Duck Banvel Technical, Final Report. Wildlife International Ltd. November 3, 1977. Review. Accession No. 232965.
- Forbis, A., D. Burgess, and L. Georgie. 1985. Acute Toxicity of CN 10-6471 [(Banvel Herbicide)] to *Daphnia magna*: Report No. 33173. Unpublished study prepared by Analytical Bio-chemistry Laboratories, Inc. [(Banvel Herbicide)] MRID 00153152.
- Gaines, T.B., and R.E. Linder. 1986. Acute toxicity of pesticides in adult and weanling rats. *Fund. Appl. Toxicol.* 7(2):299-308.
- Goldenthal, E. 1985. Lifetime Dietary Toxicity and Oncogenicity Study in Rats: Technical Dicamba: 163-694. Unpublished study prepared by International Research and Development Corp. MRID 00146150.
- _____, D.C. Jessup, and D.E. Rodwell. 1978. Teratology Study in Rabbits: IRDC No. 163- 436. (Unpublished study received March 6, 1979 under 876-36. MRID 00028236. Prepared by International Research and Development Corp., CDL:237995-E, submitted by Velsicol Chemical Corp. Chicago, Illinois).
- Hayes, W.J. 1982. Pesticides Studied in Man. Williams and Wilkins. Baltimore, Maryland. (Cited in Caux et al. 1993)
- Hill, E.F., and M.B. Camardese. 1986. Lethal Dietary Toxicities of Environmental Contaminants and Pesticides to *Coturnix*. Fish and Wildlife Technical Report No 2. U.S. Fish and Wildlife Service. Washington, DC.

- Hoberg, J. 1993a. Dicamba Technical: Determination of Effects on Seed Germination, Seedling Emergence and Vegetative Vigor of Ten Plant Species: Final Report: Lab Project Number: 93-3- 4664: 10828.0892.6141.610: 301321. Unpublished study prepared by Springborn Labs, Inc. 2. MRID 42846301.
- _____. 1993b. Dicamba Technical: Toxicity to the Duckweed, *Lemna gibba*: Final Report: Lab Project Number: 93-3-4665: 10828.0892.6140.410: 100/92/06. Unpublished study prepared by Springborn Labs, Inc. MRID 42774111.
- _____. 1993c. Dicamba Technical: Toxicity to the Marine Diatom, *Skeletonoma costatum*: Final Report: Lab Project Number: 93-3-4699: 10828.0892.6138.450: 100/92/05. Unpublished Study Prepared by Springborn Labs, Inc. MRID 42774110.
- Hoberman, A. 1992. Developmental Toxicity (Embryo-Fetal Toxicity and Teratogenic Potential) Study of Technical Dicamba Administered Orally via Capsule to New Zealand White Rabbits: Final Report: Lab Project Number: 1819-004. Unpublished study prepared by Argus Research Lab. MRID 42429401.
- Hoffman, D.J. and P.H. Albers. 1984. Evaluation of Potential Embryotoxicity and Teratogenicity of 42 Herbicides, Insecticides, and Petroleum Contaminants to Mallard (*Anas platyrhynchos*) Eggs. Archives of Environmental Contamination and Toxicology 13(1):15-28.
- Hurlbert, S.H. 1975. Secondary Effects of Pesticides on Aquatic Ecosystems. Residue Review 57:81-148.
- Johnson, C.R. 1976. Herbicide Toxicities in Some Australian Anurans and the Effect of Subacute Dosages on Temperature Tolerance. Zoological Journal of the Linnaean Society 59(1):79-83.
- _____. 1978. Herbicide Toxicities in the Mosquito Fish, *Gambusia affinis*. Proceeding of Research Society of Queensland 89:25-27.
- Johnson, W.W., and M.T. Finley. 1980. Handbook of Acute Toxicity of Chemicals to Fish and Aquatic Invertebrates. Resource Publication 137. U.S. Fish and Wildlife Service. Washington, DC.
- Kuhn, J. 1998a. Acute Dermal Toxicity Study in Rabbits: Dicamba Sodium Salt: Final Report: Lab Project Number: 3870-97. Unpublished study prepared by Stillmeadow, Inc. MRID 44524404.
- _____. 1998b. Acute Oral Toxicity Study in Rats: Dicamba Sodium Salt: Final Report: Lab Project Number: 3869-97. Unpublished Study Prepared by Stillmeadow, Inc. MRID 44524403.
- Laveglia, J., D. Rajasekaran, and L. Brewer. 1981. Thirteen-week Dietary Toxicity Study in Rats with Dicamba. IRDC No. 163-671. Unpublished Study. MRID 00128093.
- Lorz, H.W., S.W. Glenn, R.H. Williams, C.M. Kunkel, L.A. Norris, and B.R. Loper. 1979. Effects of Selected Herbicides on Smolting of Coho Salmon. Ecological Research Series, EPA-600/3-79-071. U.S. EPA, Corvallis Environmental Laboratory. Corvallis, Oregon.
- Masters, R. 1993. Technical Dicamba: A Study of the Effect on Reproductive Function of Two Generations in the Rat: Lab Project Number: SNC 140/921437. Unpublished Study Prepared by Huntingdon Research Centre Ltd. MRID 43137101.
- Palmer, J.S., and R.D. Radeleff. 1964. The Toxicological Effects of Certain Fungicides and Herbicides on Sheep and Cattle. Annals of the New York Academy of Science 111:729-735.
- Roberts, N., C. Fairley, and C. Fish. 1983. The Acute Oral Toxicity (LD₅₀) and Neurotoxic Effects of Dicamba in the Domestic Hen: HRC Report No. VCL 24/8355. MRID 00131290. (Unpublished study received September 22, 1983 under 876-36; Prepared by Huntingdon Research Centre, Eng.; CDL:251443-A). Submitted by Velsicol Chemical Corp. Chicago, Illinois.

-
- Sanders, H.O. 1969. Toxicity of Pesticides to the Crustacean *Gammarus lacustris*. USDI Technical Paper 25, Bureau of Sport Fisheries and Wildlife, U.S. Fish and Wildlife Service (Cited in Caux et al. 1993). Columbia, Montana.
- Smith, S.H., C.K. O'Loughlin, and C.M. Salamon. 1981. Teratology Study in Albino Rats with Technical Dicamba. Toxigenetics Study No. 450-0460. Unpublished Study. MRID 00084024.
- Suresh, T. 2000. Acute Toxicity Studies: Gharda Dicamba DMA Manufacturing Concentrate: Lab Project Number: 2733/99: 2736/99: 2731/99. Unpublished Study Prepared by Rallis Research Centre. MRID 45646602.
- U.S. Environmental Protection Agency (USEPA). 2003. USEPA Pesticide Ecotoxicity Database. Provided by Brian Montague, Office of Pesticide Programs. June 6, 2003.
- Velsicol Chemical Corporation. 1979. Technical Information Dicamba (Banvel) Herbicide. Bulletin 521-2. (Cited in Ghassemi et al. 1981).
- Vilkas, A. 1977a. The Acute Toxicity of Banvel Technical to the Bluegill Sunfish. Union Carbide Environmental Services. November 21, 1977. Review. Accession No. 232965.
- _____. 1977b. The Acute Toxicity of Banvel Technical to the Fiddler Crab. Union Carbide Corporation Environmental Services. December 7, 1977. Review. Accession No. 232965.
- _____. 1977c. The Acute Toxicity of Banvel Technical to the Sheepshead Minnow. Union Carbide Environmental Services. December 14, 1977. Review. Accession No. 232965.
- Wazeter, F.X., E.I. Goldenthal, and D.C. Jessup. 1977. Pilot Teratology Study in Rabbits. IRDC No. 163-436. Unpublished study. MRID 00025373.
- Witherup, S., K.L. Stemmer, and M. Roell. 1966. The Effects Exerted Upon the Fertility of Rats and Upon the Viability of their Offspring by the Introduction of Banvel D into their Diets. Unpublished study. MRID 00028249.
- Woodward, D.F. 1982. Acute Toxicity of Mixtures of Range Management Herbicides to Cutthroat Trout. Journal of Range Management 35(4):539-540.

Diflufenzopyr Bibliography List

Health Canada. 1999. Diflufenzopyr. Regulatory Note REG99-02. Pest Management Regulatory Agency, Health Canada, Ontario. Available at website: <http://www.hc-sc.gc.ca/pmra-arla/english/pdf/reg/reg9902-e.pdf>

U.S. Environmental Protection Agency (USEPA). 1999. Pesticide Fact Sheet: Diflufenzopyr. Office of Prevention, Pesticides and Toxic Substances. January 28.

_____. 2003. USEPA Pesticide Ecotoxicity Database. Provided by Brian Montague, Office of Pesticide Programs. June 6, 2003.

Overdrive® Bibliography List

Health Canada. 1999. Diflufenzopyr. Regulatory Note REG99-02. Pest Management Regulatory Agency, Health Canada, Ontario. Available at website: <http://www.hc-sc.gc.ca/pmra-arla/english/pdf/reg/reg9902-e.pdf>.

U.S. Environmental Protection Agency (USEPA). 1999. Pesticide Fact Sheet: Diflufenzopyr. Office of Prevention, Pesticides and Toxic Substances. January 28.

_____. 2003. USEPA Pesticide Ecotoxicity Database. Provided by Brian Montague, Office of Pesticide Programs. June 6, 2003.

APPENDIX A.2

SPREADSHEET OF TOXICITY DATA FOR DICAMBA TRV

Formulation	% purity a.i.	General Taxonomic Group	Common Name	Scientific Name	Age	Test Type	Means of Exposure	Exposure Duration	Test Duration	Biological Endpoint	Statistical Endpoint	Toxicity Value (tested product) ¹	Toxicity Value (ai) ¹	Units	Lab	Study Number	Data Source ²	EPA Reviewer	Date Reviewed	Used for TRV derivation
Dicamba (Banvel)		Amphibian	Frog (tadpole)	<i>Limnodynastes peroni</i>		Acute		96 hr	96 hr		LC ₅₀	NR	106	mg ai/L			Johnson 1976			Yes
Dicamba (Banvel)		Amphibian	Frog (tadpole)	<i>Adelotus brevis</i>		Acute		96 hr	96 hr		LC ₅₀	NR	185	mg ai/L			Johnson 1976			Yes
Dicamba	NOS	Aquatic Invertebrate	Water flea	<i>Daphnia pulex</i>		Acute		48 hr	48 hr		EC ₅₀	11	NR	mg/L			Hurlbert 1975			Yes
Dicamba - sodium salt	26.5	Aquatic Invertebrate	Water flea	<i>Daphnia magna</i>	<20 hr	Acute		48 hr	48 hr		EC ₅₀	38.1	NR	mg/L	Union Carbide Environmental Services	233292	USEPA 2003	C. Bowen	1977	Yes
Dicamba - acid	88	Aquatic Invertebrate	Water flea	<i>Daphnia magna</i>	1st-I	Acute		48 hr	48 hr		EC ₅₀	>	100	mg/L	Fish & Wildlife Service Laboratories	40094602	USEPA 2003	Johnson & Finley	1980	Yes
Dicamba - acid	88	Aquatic Invertebrate	Water flea	<i>Daphnia magna</i>	1st-I	Acute		48 hr	48 hr		EC ₅₀	110.7	NR	mg/L	Union Carbide Environmental Services	52126	USEPA 2003	L. Touart	1983	Yes
Dicamba - acid	38P	Aquatic Invertebrate	Water flea	<i>Daphnia magna</i>	1st-I	Acute		48 hr	48 hr		EC ₅₀	750	NR	mg/L	ABC	258983	USEPA 2003	E.E. Zucker	1985	Yes
Dicamba - acid	87	Aquatic Invertebrate	Brown shrimp marine	<i>Penaes aztecus</i>	Juvenile	Acute		48 hr	48 hr		LC ₅₀	>	1	mg/L	EPA Labs, Beltsville, MD or Gulfbreeze, FL	40228401	USEPA 2003 ⁶	F.L. Mayer	1986	No
Dicamba	NOS	Aquatic Invertebrate	Scud (freshwater amphipod)	<i>Gammarus lacustris</i>		Acute		96 hr	96 hr		LC₅₀	3.8	NR	mg/L			Hurlbert 1975			Yes
Dicamba - acid (formulated)		Aquatic Invertebrate	Scud	<i>Gammarus lacustris</i>	Adult	Acute		96 hr	96 hr		LC ₅₀	3.9	NR	mg/L	Fish & Wildlife Service Laboratories	5009242	USEPA 2003	H.O. Sanders	1980	Yes
Dicamba	NOS	Aquatic Invertebrate	Scud	<i>Gammarus lacustris</i>		Acute		96 hr	96 hr		LC ₅₀	3.9	NR	mg/L			Sanders 1969			Yes
Dicamba	NOS	Aquatic Invertebrate	Scud	<i>Gammarus lacustris</i>		Acute		48 hr	48 hr		LC ₅₀	5.8	NR	mg/L			Sanders 1969			Yes
Dicamba - acid	88	Aquatic Invertebrate	Glass shrimp	<i>Palaemonetes kadiakensis</i>	Adult	Acute		96 hr	96 hr		LC ₅₀	>	56	mg/L	Fish & Wildlife Service Laboratories	40098001	USEPA 2003	Mayer & Ellersieck	1986	Yes
Dicamba (technical grade)	88	Aquatic Invertebrate	Glass shrimp	<i>Palaemonetes kadiakensis</i>		Acute		96 hr	96 hr		LC ₅₀	NR	>	56	mg ai/L		Johnson & Finley 1980			Yes
Dicamba - acid	86.2	Aquatic Invertebrate	Grass shrimp	<i>Palaemonetes pugio</i>	Juvenile	Acute		96 hr	96 hr		LC ₅₀	>	100	mg/L	Union Carbide Environmental Services	34702	USEPA 2003	L. Touart	1983	Yes
Dicamba - acid	88	Aquatic Invertebrate	Sowbug	<i>Asellus brevicaudus</i>	Adult	Acute		96 hr	96 hr		LC ₅₀	>	100	mg/L	Fish & Wildlife Service Laboratories	40098001	USEPA 2003	Mayer & Ellersieck	1986	Yes
Dicamba - acid	88	Aquatic Invertebrate	Scud	<i>Gammarus fasciatus</i>	Adult	Acute		96 hr	96 hr		LC ₅₀	>	100	mg/L	Fish & Wildlife Service Laboratories	40098001	USEPA 2003	Mayer & Ellersieck	1986	Yes
Dicamba (technical grade)	88	Aquatic Invertebrate	Water flea	<i>Daphnia magna</i>		Acute		48 hr	48 hr		LC ₅₀	NR	>	100	mg ai/L		Johnson & Finley 1980			Yes
Dicamba	NOS	Aquatic Invertebrate	Water flea	<i>Daphnia magna</i>		Acute		48 hr	48 hr		LC ₅₀	>	100	mg/L			Sanders 1969			Yes
Dicamba (technical grade)	88	Aquatic Invertebrate	Scud	<i>Gammarus fasciatus</i>		Acute		96 hr	96 hr		LC ₅₀	NR	>	100	mg ai/L		Johnson & Finley 1980			Yes
Dicamba (technical grade)	88	Aquatic Invertebrate	Sowbug	<i>Asellus brevicaudus</i>		Acute		96 hr	96 hr		LC ₅₀	NR	>	100	mg ai/L		Johnson & Finley 1980			Yes
Dicamba - acid	86.8	Aquatic Invertebrate	Fiddler crab	<i>Uca pugilator</i>	2 g	Acute		96 hr	96 hr		LC ₅₀	>	180	mg/L	Union Carbide Environmental Services	34704	USEPA 2003	L. Touart	1983	Yes
Dicamba	40.15	Aquatic Invertebrate	Water flea	<i>Daphnia magna</i>		Acute		48 hr	48 hr		LC ₅₀	>	1,000	mg/L			Forbis et al. 1985 ^{3,5}			Yes
Banvel (technical)	86.82	Aquatic Invertebrate	Grass shrimp	<i>Palaemonetes pugio</i>		Acute		96 hr	96 hr		LOEL	100	NR	mg/L			34702	Vilkas 1977b ³		Yes
Banvel (technical)	86.82	Aquatic Invertebrate	Grass shrimp	<i>Palaemonetes pugio</i>		Acute		96 hr	96 hr		NOEL	56	NR	mg/L			34702	Vilkas 1977b ³		Yes
Banvel (technical)	86.82	Aquatic Invertebrate	Fiddler crab	<i>Uca pugilator</i>		Acute		96 hr	96 hr		NOEL	180	NR	mg/L			34704	Vilkas 1977b ³		Yes

Formulation	% purity a.i.	General Taxonomic Group	Common Name	Scientific Name	Age	Test Type	Means of Exposure	Exposure Duration	Test Duration	Biological Endpoint	Statistical Endpoint	Toxicity Value (tested product) ¹	Toxicity Value (ai) ¹	Units	Lab	Study Number	Data Source ²	EPA Reviewer	Date Reviewed	Used for TRV derivation
Dicamba	40.15	Aquatic Invertebrate	Water flea	<i>Daphnia magna</i>		Acute		48 hr	48 hr		NOEL	1,000	NR	mg/L		153152	Forbis et al. 1985 ^{3,5}			Yes
Dicamba - acid	88	Aquatic Invertebrate	Water flea	<i>Daphnia magna</i>	1st-I	Acute		48 hr	48 hr		NOEL	<	18	mg/L	Union Carbide Environmental Services	52126	USEPA 2003	L. Touart	1983	Yes
Dicamba - sodium salt	26.5	Aquatic Invertebrate	Water flea	<i>Daphnia magna</i>	<20 hr	Acute		48 hr	48 hr		NOEL	<	18	mg/L	Union Carbide Environmental Services	233292	USEPA 2003	C. Bowen	1977	Yes
Dicamba - acid	86.2	Aquatic Invertebrate	Grass shrimp	<i>Palaemonetes pugio</i>	Juvenile	Acute		96 hr	96 hr		NOEL	56	NR	mg/L	Union Carbide Environmental Services	34702	USEPA 2003	L. Touart	1983	Yes
Dicamba - acid	38P	Aquatic Invertebrate	Water flea	<i>Daphnia magna</i>	1st-I	Acute		48 hr	48 hr		NOEL	560	NR	mg/L	ABC	258983	USEPA 2003	E.E. Zucker	1985	Yes
Dicamba (analytical grade)	NOS	Aquatic Plant	Freshwater algae	<i>Coccomyxa subellipsoidea</i>	NR			5-30 d			EC ₁₀₀	NR	0.9	mg ai/L			Cullimore 1975			Yes
Dicamba (analytical grade)	NOS	Aquatic Plant	Freshwater algae	<i>Hormidium barlowi</i>	NR			5-30 d			EC ₁₀₀	NR	2.0	mg ai/L			Cullimore 1975			Yes
Dicamba - acid	89.5	Aquatic Plant	Bluegreen algae	<i>Anabaena flos-aquae</i>	NR			5 d			EC ₅₀	0.061	NR	mg/L	Springborn Laboratory Inc., MA	42774109	USEPA 2003 ⁷	M. Davy	1997	No
Dicamba - acid	89.5	Aquatic Plant	Marine diatom	<i>Skeletonema costatum</i>	NR			5 d			EC ₅₀	0.49	NR	mg/L	Springborn Laboratory Inc., MA	42774110	USEPA 2003 ⁶	M. Davy	1995	No
Dicamba - acid	89.5	Aquatic Plant	Marine diatom	<i>Skeletonema costatum</i>	NR			5 d			EC ₅₀	0.58	NR	mg/L		42774110	Hoberg 1993c ⁶			No
Dicamba - acid	89.5	Aquatic Plant	Freshwater diatom	<i>Navicula pelliculosa</i>	NR			5 d			EC ₅₀	2.30	NR	mg/L	Springborn Laboratory Inc., MA	42774108	USEPA 2003	M. Davy	1994	Yes
Dicamba - acid	89.5	Aquatic Plant	Duckweed	<i>Lemna gibba</i>	NR			14 d			EC ₅₀	>	3.25	mg/L	Springborn Laboratory Inc., MA	42774111	USEPA 2003	M. Davy	1996	Yes
Dicamba - acid	89.5	Aquatic Plant	Green algae	<i>Selenastrum capricornutum</i>	NR			5 d			EC ₅₀	>	3.7	mg/L	Springborn Laboratory Inc., MA	42774107	USEPA 2003	M. Davy	1993	Yes
Dicamba -sodium salt (technical grade)	NOS	Aquatic Plant	Green algae	<i>Selenastrum capricornutum</i>	NR			4 d		biomass	EC ₅₀	NR	36.375	mg ai/L			Fairchild et al. 1997			Yes
Dicamba (analytical grade)	NOS	Aquatic Plant	Freshwater algae	<i>Hormidium barlowi</i>	NR			5-30 d			EC₅₀	NR	0.1-0.5	mg ai/L			Cullimore 1975			Yes
Dicamba (analytical grade)	NOS	Aquatic Plant	Freshwater algae	<i>Coccomyxa subellipsoidea</i>	NR			5-30 d			EC ₅₀	NR	0.2 - 0.5	mg ai/L			Cullimore 1975			Yes
Dicamba - acid	89.5	Aquatic Plant	Duckweed	<i>Lemna gibba</i>	NR			14 d			LOEC	NR	0.510	mg ai/L		42774111	Hoberg 1993b			Yes
Dicamba -sodium salt (technical grade)	NOS	Aquatic Plant	Green algae	<i>Selenastrum capricornutum</i>	NR			4 d		biomass	LOEC	NR	25	mg ai/L			Fairchild et al. 1997			Yes
Dicamba (analytical grade)	NOS	Aquatic Plant	Freshwater algae	<i>Chlamydomonas agloiformis</i> + 11 other species	NR			5-30 d			NOEC	NR	10	mg ai/L			Cullimore 1975			Yes
Dicamba -sodium salt (technical grade)	NOS	Aquatic Plant	Green algae	<i>Selenastrum capricornutum</i>	NR			4 d		biomass	NOEC	NR	12.5	mg ai/L			Fairchild et al. 1997			Yes
Dicamba -sodium salt (technical grade)	NOS	Aquatic Plant	Duckweed	<i>Lemna gibba</i>	NR			4 d			NOEC	NR	100	mg ai/L			Fairchild et al. 1997			Yes
Dicamba - acid	89.5	Aquatic Plant	Bluegreen algae	<i>Anabaena flos-aquae</i>	NR			5 d			NOEL	0.0049	NR	mg/L	Springborn Laboratory Inc., MA	42774109	USEPA 2003 ⁷	M. Davy	1997	No
Dicamba - acid	89.5	Aquatic Plant	Marine diatom	<i>Skeletonema costatum</i>	NR			5 d			NOEL	0.0097	NR	mg/L		42774110				No

Formulation	% purity a.i.	General Taxonomic Group	Common Name	Scientific Name	Age	Test Type	Means of Exposure	Exposure Duration	Test Duration	Biological Endpoint	Statistical Endpoint	Toxicity Value (tested product) ¹	Toxicity Value (ai) ¹	Units	Lab	Study Number	Data Source ²	EPA Reviewer	Date Reviewed	Used for TRV derivation
Dicamba - acid	89.5	Aquatic Plant	Freshwater diatom	<i>Navicula pelliculosa</i>	NR			5 d			NOEL	0.51	NR	mg/L	Springborn Laboratory Inc., MA	42774108	USEPA 2003	M. Davy	1994	Yes
Dicamba - acid	89.5	Aquatic Plant	Green algae	<i>Selenastrum capricornutum</i>	NR			5 d			NOEL	3.7	NR	mg/L	Springborn Laboratory Inc., MA	42774107	USEPA 2003	M. Davy	1993	Yes
Dicamba - acid	89.5	Aquatic Plant	Marine diatom	<i>Skeletonema costatum</i>	NR			5 d			NOEL	> 0.011	NR	mg/L	Springborn Laboratory Inc., MA	42774110	USEPA 2003 ⁶	M. Davy	1995	No
Dicamba - acid	89.5	Aquatic Plant	Duckweed	<i>Lemna gibba</i>	NR			14 d			NOEL	0.2	NR	mg/L	Springborn Laboratory Inc., MA	42774111	USEPA 2003	M. Davy	1996	Yes
Banvel NOS		Bird	Mallard duck	<i>Anas platyrhynchos</i>	embryo	Egg immersion		30 seconds on day 3 of development	Observed on day 18		LC ₅₀	NR	> 200	lb ai/acre			Hoffman & Albers 1984			Yes
Dicamba - acid	86.6	Bird	Bobwhite quail	<i>Colinus virginianus</i>	14 d	Acute	Diet	8 d	8 d		LC ₅₀	> 10,000	NR	ppm	Wildlife International	25391	USEPA 2003	L. Touart	1983	Yes
Dicamba - acid	86.6	Bird	Mallard duck	<i>Anas platyrhynchos</i>	14 d	Acute	Diet	8 d	8 d		LC ₅₀	> 10,000	NR	ppm	Wildlife International	TOUDIC07	USEPA 2003	L. Touart	1983	Yes
Dicamba - sodium salt	22	Bird	Bobwhite quail	<i>Colinus virginianus</i>	14 d	Acute	Diet	8 d	8 d		LC ₅₀	> 10,000	NR	ppm	Truslo Farm, Inc.	25328	USEPA 2003	L. Touart	1983	Yes
Dicamba - sodium salt	22	Bird	Mallard duck	<i>Anas platyrhynchos</i>	14 d	Acute	Diet	8 d	8 d		LC ₅₀	> 10,000	NR	ppm	Truslo Farm, Inc.	30102	USEPA 2003	L. Touart	1983	Yes
Dicamba NOS		Bird	Mallard duck	<i>Anas platyrhynchos</i>		Acute	Diet	8 d			LC ₅₀	> 10,000	NR	ppm		4279400	Bryant 1993			Yes
Dicamba - acid	86.6	Bird	Bobwhite quail	<i>Colinus virginianus</i>	26 w	Acute	Oral	14 d	14 d		LD ₅₀	216	NR	mg/kg bw	Wildlife International	42918001	USEPA 2003	H. Craven	1995	Yes
Dicamba - acid	86.6	Bird	Bobwhite quail	<i>Colinus virginianus</i>	26 w	Acute	Oral	14 d	14 d		LD ₅₀	216	NR	mg/kg bw	Wildlife International	42774105	USEPA 2003	H. Craven (KBN)	1993	Yes
Dicamba NOS		Bird	Chicken - domestic	<i>Gallus domesticus</i>		Acute		14 d			LD ₅₀	306	NR	mg/kg		131290	Roberts et al. 1983			Yes
Dicamba - sodium salt		Bird	chicken - commercial	<i>Gallus domesticus</i>		Acute	Oral	single dose		neurotoxicity ⁹	LD ₅₀	673	NR	mg/kg			Edson & Sanderson 1965			Yes
Dicamba - acid	86.6	Bird	Mallard duck	<i>Anas platyrhynchos</i>	27 w	Oral	Oral	14 d	14 d		LD ₅₀	1,373	NR	mg/kg bw	Wildlife International	42774106	USEPA 2003	M. Davy	1993	Yes
Dicamba - acid	86.6	Bird	Mallard duck	<i>Anas platyrhynchos</i>	14 d	Acute	Oral	8 d	8 d		LD ₅₀	1,951	NR	mg/kg bw	Wildlife International	25392	USEPA 2003	D. Urban (KBN)	1987	Yes
Dicamba (Banvel)	86.8	Bird	Mallard duck	<i>Anas platyrhynchos</i>		Acute	Oral	single dose			LD ₅₀	2,000	NR	mg/kg bw			Velsicol Chemical Corp 1979			Yes
Dicamba - acid	86.6	Bird	Mallard duck	<i>Anas platyrhynchos</i>	14 d	Acute	Oral	8 d	8 d		LD ₅₀	2,009	NR	mg/kg bw	Wildlife International	25392	USEPA 2003	L. Touart	1983	Yes
Dicamba NOS		Bird	Mallard duck	<i>Anas platyrhynchos</i>		Acute	Oral				LD ₅₀	2,009	NR	mg/kg bw		4279400	Bryant 1993			Yes
Dicamba (Banvel)	86.8	Bird	Mallard duck	<i>Anas platyrhynchos</i>	14 d	Sub Acute	Diet	8 d			LD ₅₀	2,009	NR	mg/kg/d		Accession # 232965	Fink 1977a			Yes
Dicamba (Banvel)	86.8	Bird	Mallard duck	<i>Anas platyrhynchos</i>		Sub Acute	Diet	8 d			LD ₅₀	> 10,000	NR	ppm		Accession # 232965	Velsicol Chemical Corp 1979			Yes
Dicamba (Banvel)	86.8	Bird	Bobwhite quail	<i>Colinus virginianus</i>		Acute		8 d	8 d		LD ₅₀	> 10,000	NR	ppm			Velsicol Chemical Corp 1979			Yes
Dicamba (Banvel)	86.8	Bird	Mallard duck	<i>Anas platyrhynchos</i>	14 d	Sub Acute	Diet	8 d			LOEL	215	NR	mg/kg/d		Accession # 232965	Fink 1977a			Yes
Dicamba - acid	86.9	Bird	Bobwhite quail	<i>Colinus virginianus</i>	Early Life	Reproductive	Diet	21 w	21 w		LOEL	> 1,600	NR	ppm	Wildlife International	43814004	USEPA 2003	D. Rieder	1996	Yes
Dicamba - acid	86.9	Bird	Mallard duck	<i>Anas platyrhynchos</i>	Early Life	Reproductive	Diet	21 w	21 w		LOEL	1,600	NR	ppm	Wildlife International	43814003	USEPA 2003	D. Rieder	1996	Yes
Dicamba (Banvel)	86.8	Bird	Mallard duck	<i>Anas platyrhynchos</i>	14 d	Sub Acute	Diet	5 d			LOEL	4,640	NR	ppm		Accession # 232965	Fink 1977c			Yes
Dicamba - acid	86.6	Bird	Bobwhite quail	<i>Colinus virginianus</i>	26 w	Acute	Oral	14 d	14 d		NOEL	15.6	NR	mg/kg bw	Wildlife International	42918001	USEPA 2003	H. Craven	1995	Yes
Dicamba - acid	86.6	Bird	Bobwhite quail	<i>Colinus virginianus</i>	26 w	Acute	Oral	14 d	14 d		NOEL	15.6	NR	mg/kg bw	Wildlife International	42774105	USEPA 2003	H. Craven (KBN)	1993	Yes
Dicamba - acid	86.6	Bird	Mallard duck	<i>Anas platyrhynchos</i>	27 w	Oral	Oral	14 d	14 d		NOEL	< 175	< NR	mg/kg bw	Wildlife International	42774106	USEPA 2003	M. Davy	1993	Yes

Formulation	% purity a.i.	General Taxonomic Group	Common Name	Scientific Name	Age	Test Type	Means of Exposure	Exposure Duration	Test Duration	Biological Endpoint	Statistical Endpoint	Toxicity Value (tested product) ¹	Toxicity Value (ai) ¹	Units	Lab	Study Number	Data Source ²	EPA Reviewer	Date Reviewed	Used for TRV derivation
Dicamba - acid	86.9	Bird	Mallard duck	<i>Anas platyrhynchos</i>	Early Life	Reproductive	Diet	21 w	21 w		NOEL	800	NR	ppm	Wildlife International	43814003	USEPA 2003	D. Rieder	1996	Yes
Dicamba - acid	86.6	Bird	Bobwhite quail	<i>Colinus virginianus</i>	14 d	Acute	Diet	8 d	8 d		NOEL	1,000	NR	ppm	Wildlife International	25391	USEPA 2003	L. Touart	1983	Yes
Dicamba (Banvel)	86.8	Bird	Bobwhite quail	<i>Colinus virginianus</i>	14 d	Acute		5 d	5 d	abnormal feeding behavior - no effect on weight gain	NOEL	1,000	NR	ppm		Accession # 232965	Fink 1977b			Yes
Dicamba - acid	86.9	Bird	Bobwhite quail	<i>Colinus virginianus</i>	Early Life	Reproductive	Diet	21 w	21 w		NOEL	1,600	NR	ppm	Wildlife International	43814004	USEPA 2003	D. Rieder	1996	Yes
Dicamba - acid	86.6	Bird	Mallard duck	<i>Anas platyrhynchos</i>	14 d	Acute	Diet	8 d	8 d		NOEL	2,150	NR	ppm	Wildlife International	TOUDIC07	USEPA 2003	L. Touart	1983	Yes
Dicamba (Banvel)	86.8	Bird	Mallard duck	<i>Anas platyrhynchos</i>	14 d	Sub Acute	Diet	5 d		lethargy, loss of coord, limb weakness	NOEL	2,150	NR	ppm		Accession # 232965	Fink 1977c			Yes
Dicamba (technical)	89.3	Bird	Japanese quail	<i>Coturnix japonica</i>	14d chicks	Sub Acute	Diet	5 d			NOEL	5,000	NR	ppm			Hill and Camardese 1986			Yes
Dicamba - sodium salt	22	Bird	Bobwhite quail	<i>Colinus virginianus</i>	14 d	Acute	Diet	8 d	8 d		NOEL	10,000	NR	ppm	Truslo Farm, Inc.	25328	USEPA 2003	L. Touart	1983	Yes
Dicamba - sodium salt	22	Bird	Mallard duck	<i>Anas platyrhynchos</i>	14 d	Acute	Diet	8 d	8 d		NOEL	10,000	NR	ppm	Truslo Farm, Inc.	00030102	USEPA 2003	L. Touart	1983	Yes
Dicamba - acid	87	Fish	Spot croaker-marine	<i>Leiostomus xanthurus</i>	Juvenile	Acute		48 hr	48 hr		LC ₅₀	> 1	> NR	mg/L	EPA Labs, Beltsville, MD or Gulfbreeze, FL	40228401	USEPA 2003 ⁶	F.L. Mayer	1986	No
Dicamba - acid	88	Fish	Rainbow trout	<i>Oncorhynchus mykiss</i>	0.8 g	Acute		96 hr	96 hr		LC ₅₀	28	NR	mg/L	Fish & Wildlife Service Laboratories	40098001	USEPA 2003	Mayer & Ellersieck	1986	Yes
Dicamba (technical grade)	88	Fish	Rainbow trout	<i>Oncorhynchus mykiss</i>		Acute		96 hr	96 hr		LC ₅₀	28	NR	mg/L			Johnson & Finley 1980 ^{3,4}			Yes
Dicamba - acid	88	Fish	Bluegill sunfish	<i>Lepomis macrochirus</i>	0.9 g	Acute		96 hr	96 hr		LC ₅₀	> 50	> NR	mg/L	Fish & Wildlife Service Laboratories	40098001	USEPA 2003	Mayer & Ellersieck	1986	Yes
Dicamba (technical grade)	88	Fish	Bluegill sunfish	<i>Lepomis macrochirus</i>		Acute		96 hr	96 hr		LC ₅₀	> 50	NR	mg/L			Johnson & Finley 1980 ^{3,4}			Yes
Dicamba (technical grade)	88	Fish	Cutthroat trout	<i>Oncorhynchus clarki</i>		Acute		96 hr	96 hr		LC ₅₀	NR	> 50	mg ai/L			Woodward 1982			Yes
Dicamba - acid	38P	Fish	Rainbow trout	<i>Oncorhynchus mykiss</i>	NR	Acute		96 hr	96 hr		LC ₅₀	130	NR	mg/L	ABC	258983	USEPA 2003	E.E. Zucker	1985	Yes
Dicamba	NOS	Fish	Bluegill sunfish	<i>Lepomis macrochirus</i>		Acute		48 hr	48 hr		LC ₅₀	130	NR	mg/L			Hurlbert 1975			Yes
Dicamba - acid	86.8	Fish	Bluegill sunfish	<i>Lepomis macrochirus</i>	0.44 g	Acute		96 hr	96 hr		LC ₅₀	135.3	NR	mg/L	Union Carbide Environmental Services	34703	USEPA 2003	L. Touart	1983	Yes
Banvel (technical)	88	Fish	Bluegill sunfish	<i>Lepomis macrochirus</i>		Acute		96 hr	96 hr		LC ₅₀	NR	135.3	mg ai/L			Vilkas 1977a			Yes
Dicamba - acid	86.8	Fish	Rainbow trout	<i>Oncorhynchus mykiss</i>	0.36 g	Acute		96 hr	96 hr		LC ₅₀	135.4	NR	mg/L	Union Carbide Environmental Services	41272	USEPA 2003	L. Touart	1983	Yes
Dicamba - acid	10	Fish	Rainbow trout	<i>Oncorhynchus mykiss</i>	1.3 g	Acute		96 hr	96 hr		LC ₅₀	153	NR	mg/L	EG & G Corp (Diamond Shamrock)	36915	USEPA 2003	L. Touart	1983	Yes
Dicamba - acid	86.6	Fish	Sheepshead minnow	<i>Cyprinodon variegatus</i>	0.48 g	Acute		96 hr	96 hr		LC ₅₀	> 180	> NR	mg/L	Union Carbide Environmental Services	25390	USEPA 2003	L. Touart	1983	Yes
Dicamba - acid	38P	Fish	Bluegill sunfish	<i>Lepomis macrochirus</i>	0.36 g	Acute		96 hr	96 hr		LC ₅₀	180	NR	mg/L	ABC	258983	USEPA 2003	E.E. Zucker	1985	Yes
Banvel (technical; reference standard)	87	Fish	Sheepshead minnow	<i>Cyprinodon variegatus</i>		Acute		96 hr	96 hr		LC ₅₀	NR	> 180	mg ai/L		Accession # 232965	Vilkas 1977c			Yes
Dicamba (Banex)		Fish	Mosquito fish	<i>gambusia affinis</i>		Acute		96 hr	96 hr		LC ₅₀	NR	465	mg ai/L			Johnson 1978			Yes

Formulation	% purity a.i.	General Taxonomic Group	Common Name	Scientific Name	Age	Test Type	Means of Exposure	Exposure Duration	Test Duration	Biological Endpoint	Statistical Endpoint	Toxicity Value (tested product) ¹	Toxicity Value (ai) ¹	Units	Lab	Study Number	Data Source ²	EPA Reviewer	Date Reviewed	Used for TRV derivation
Dicamba - sodium salt	22?	Fish	Rainbow trout	<i>Oncorhynchus mykiss</i>	1 g	Acute		96 hr	96 hr		LC ₅₀	558	NR	mg/L	Bionomics, Inc.	29623	USEPA 2003	L. Touart	1983	Yes
Dicamba - sodium salt	22	Fish	Bluegill sunfish	<i>Lepomis macrochirus</i>	1.0 g	Acute		96 hr	96 hr		LC ₅₀	706	NR	mg/L	Bionomics, Inc.	22539	USEPA 2003	L. Touart	1983	Yes
Banvel (technical)	88	Fish	Bluegill sunfish	<i>Lepomis macrochirus</i>		Acute		96 hr	96 hr		NOEL	NR	56	mg ai/L			Vilkas 1977a			Yes
Dicamba (Banvel)		Fish	Coho salmon	<i>Oncorhynchus kisutch</i>	Yearling	Acute		144 hr	144 hr + 268 hr	mortality	NOEL	NR	110	mg ai/L			Lorz 1979			Yes
Dicamba - acid	86.8	Fish	Rainbow trout	<i>Oncorhynchus mykiss</i>	0.36 g	Acute		96 hr	96 hr		NOEL	100	NR	mg/L	Union Carbide Environmental Services	41272	USEPA 2003	L. Touart	1983	Yes
Dicamba - acid	86.6	Fish	Sheepshead minnow	<i>Cyprinodon variegatus</i>	0.48 g	Acute		96 hr	96 hr		NOEL	100	NR	mg/L	Union Carbide Environmental Services	25390	USEPA 2003	L. Touart	1983	Yes
Dicamba - acid	86.8	Fish	Bluegill sunfish	<i>Lepomis macrochirus</i>	0.44 g	Acute		96 hr	96 hr		NOEL	100	NR	mg/L	Union Carbide Environmental Services	34703	USEPA 2003	L. Touart	1983	Yes
Dicamba - acid	38P	Fish	Bluegill sunfish	<i>Lepomis macrochirus</i>	0.36 g	Acute		96 hr	96 hr		NOEL	100	NR	mg/L	ABC	258983	USEPA 2003	E.E. Zucker	1985	Yes
Dicamba - acid	10	Fish	Rainbow trout	<i>Oncorhynchus mykiss</i>	1.3 g	Acute		96 hr	96 hr		NOEL	49	NR	mg/L	EG & G Corp (Diamond Shamrock)	36915	USEPA 2003	L. Touart	1983	Yes
Dicamba - sodium salt	22?	Fish	Rainbow trout	<i>Oncorhynchus mykiss</i>	1 g	Acute		96 hr	96 hr		NOEL	490	NR	mg/L	Bionomics, Inc.	29623	USEPA 2003	L. Touart	1983	Yes
Dicamba - sodium salt	22	Fish	Bluegill sunfish	<i>Lepomis macrochirus</i>	1.0 g	Acute		96 hr	96 hr		NOEL	490	NR	mg/L	Bionomics, Inc.	22539	USEPA 2003	L. Touart	1983	Yes
Dicamba - acid (technical grade)		Insect	Honey bee	<i>Apis mellifera</i>	Adult	Dermal Contact		48 hr	48 hr		LD50	> 90.65	NR	µg/bee	University of California, Riverside	00036935	USEPA 2003	A. Vaughan	1983	Yes
Dicamba - acid (technical grade)		Insect	Honey bee	<i>Apis mellifera</i>	Adult	Dermal Contact		48 hr	48 hr		NOEL	< 90.65	NR	µg/bee	University of California, Riverside	00036935	USEPA 2003	A. Vaughan	1983	Yes
Dicamba - sodium salt	NOS	Mammal	Mouse - female	<i>Mus spp.</i>		Acute	Oral	single application	>7 d	mortality	LD₅₀	566	NR	mg/kg/d			Edson & Sanderson 1965¹¹			Yes
Dicamba - sodium salt	NOS	Mammal	Rabbit	<i>Oryctolagus cuniculus</i>		Acute	Oral	1 d	>7 d	mortality	LD ₅₀	566	NR	mg/kg/d			Edson & Sanderson 1965 ¹¹			Yes
Dicamba (technical)	NOS	Mammal	Rat - male	<i>Rattus spp.</i>		Acute	Oral	single application	>7 d	mortality	LD ₅₀	757	NR	mg/kg/d			Edson & Sanderson 1965			Yes
Dicamba pure		Mammal	Rat - female	<i>Rattus spp.</i>		Dermal Contact		single application	>7 d	mortality	LD ₅₀	> 1,000	NR	mg/kg/d			Edson & Sanderson 1965			Yes
Dicamba (technical)	NOS	Mammal	Rat - female	<i>Rattus spp.</i>		Dermal Contact		single application	>7 d	mortality	LD ₅₀	> 1,000	NR	mg/kg/d			Edson & Sanderson 1965			Yes
Dicamba (technical)	NOS	Mammal	Rat - female	<i>Rattus spp.</i>		Acute	Oral	single application	>14 d	mortality	LD ₅₀	1,039	NR	mg/kg/d			Gaines & Linder 1986			Yes
Dicamba - sodium salt	NOS	Mammal	Rat - male	<i>Rattus spp.</i>		Acute	Oral	single application	>7 d	mortality	LD ₅₀	1,100	NR	mg/kg/d			Edson & Sanderson 1965			Yes
Dicamba (technical)	NOS	Mammal	Mouse - female	<i>Mus spp.</i>		Acute	Oral	single application	>7 d	mortality	LD ₅₀	1,189	NR	mg/kg/d			Edson & Sanderson 1965			Yes
Dicamba (technical)	NOS	Mammal	Rat - male	<i>Rattus spp.</i>		Acute	Oral	single application	>14 d	mortality	LD ₅₀	1,404	NR	mg/kg/d			Gaines & Linder 1986			Yes
Dicamba (technical)	NOS	Mammal	Rat - female	<i>Rattus spp.</i>		Acute	Oral	single application	>7 d	mortality	LD ₅₀	1,414	NR	mg/kg/d			Edson & Sanderson 1965			Yes
DMA salt	40	Mammal	Rat - male	<i>Rattus spp.</i>		Acute	Oral	single application	>14 d	mortality	LD ₅₀	1,918	NR	mg/kg/d		44502703	Kuhn 1998b			Yes
Banvel (technical)		Mammal	Rabbit	<i>Oryctolagus cuniculus</i>		Dermal Contact				mortality	LD ₅₀	> 2,000	NR	mg/kg			Velsicol Chemical Corp 1979			Yes
Banvel (4 lbs/gal)		Mammal	Rabbit	<i>Oryctolagus cuniculus</i>		Dermal Contact				mortality	LD ₅₀	> 2,000	NR	mg/kg			Velsicol Chemical Corp 1979			Yes
Dicamba NOS		Mammal	Rabbit	<i>Oryctolagus cuniculus</i>		Acute	Oral	1 d	1 d	mortality	LD ₅₀	2,000	NR	mg/kg/d			Hayes 1982			Yes
DMA salt	40	Mammal	Rat - female	<i>Rattus spp.</i>		Acute	Oral	single application	>14 d	mortality	LD ₅₀	2,087	NR	mg/kg/d		44502703	Kuhn 1998b			Yes

Formulation	% purity a.i.	General Taxonomic Group	Common Name	Scientific Name	Age	Test Type	Means of Exposure	Exposure Duration	Test Duration	Biological Endpoint	Statistical Endpoint	Toxicity Value (tested product) ¹	Toxicity Value (ai) ¹	Units	Lab	Study Number	Data Source ²	EPA Reviewer	Date Reviewed	Used for TRV derivation
Dicamba pure		Mammal	Rat - female	<i>Rattus</i> spp.		Acute	Oral	single application	>7 d	mortality	LD ₅₀	>	2,560	NR	mg/kg		Edson & Sanderson 1965			Yes
Banvel (technical)	85-90	Mammal	Rat	<i>Rattus</i> spp.		Acute	Oral	single application	most deaths in 3-10 h	mortality	LD ₅₀		2,900	NR	mg/kg/d	25377				Yes
Dicamba NOS		Mammal	Guinea pig	<i>Cavia</i> spp.		Acute	Oral	1 d		mortality	LD ₅₀		3,000	NR	mg/kg/d		Hayes 1982			Yes
Dicamba (technical)	NOS	Mammal	Rat - male weanlings	<i>Rattus</i> spp.		Acute	Oral	single application	>14 d	mortality	LD ₅₀		3,294	NR	mg/kg/d		Gaines & Linder 1986			Yes
DMA salt	99.8	Mammal	Rat - male & female	<i>Rattus</i> spp.		Acute	Oral	single application	15 d	mortality	LD ₅₀		5,000	NR	mg/kg/d	45646602	Suresh 2000			Yes
Dicamba - sodium salt	21.06	Mammal	Rabbit	<i>Oryctolagus cuniculus</i>		Dermal Contact		single application	14 d	mortality	LD₅₀	>	5,050	NR	mg/kg	44524404	Kuhn 1998a			Yes
Dicamba - sodium salt	21.06	Mammal	Rat - male & female	<i>Rattus</i> spp.		Acute	Oral	single application	14 d	mortality	LD ₅₀	>	5,050	NR	mg/kg	44524403	Kuhn 1998b			Yes
Dicamba (technical)	87.7	Mammal	Rabbit - female	<i>Oryctolagus cuniculus</i>		Oral		gestation days 6-18		maternal toxicity	LOAEL		10	NR	mg/kg/d	25373	Wazeter et al. 1977			Yes
Dicamba (technical)	87.7	Mammal	Rabbit - female	<i>Oryctolagus cuniculus</i>		Oral		gestation days 6-18		developmental	LOAEL		10	NR	mg/kg/d	25373	Wazeter et al. 1977			Yes
Banvel D (technical)	87.7	Mammal	Rabbit - female	<i>Oryctolagus cuniculus</i>		Oral		gestation days 6-18		maternal toxicity	LOAEL		10	NR	mg/kg/d	28236	Goldenthal 1978 ¹²			Yes
Banvel D (technical)	87.7	Mammal	Rabbit - female	<i>Oryctolagus cuniculus</i>		Oral		gestation days 6-18		developmental	LOAEL		10	NR	mg/kg/d	28236	Goldenthal 1978 ¹²			Yes
Dicamba (technical)	86.9	Mammal	Rat	<i>Rattus</i> spp.		Diet		2 gen		reproductive	LOAEL		105	NR	mg/kg/d	43137101	Masters 1993			Yes
Dicamba (technical)	NOS	Mammal	Rabbit - female	<i>Oryctolagus cuniculus</i>		Oral		gestation days 6-18	29 d	maternal toxicity	LOAEL		150	NR	mg/kg/d	42429401	Hoberman 1992			Yes
Dicamba (technical)	NOS	Mammal	Rabbit - female	<i>Oryctolagus cuniculus</i>		Oral		gestation days 6-18	29 d	developmental	LOAEL		150	NR	mg/kg/d	42429401	Hoberman 1992			Yes
Dicamba (technical)	NOS	Mammal	Rat - female	<i>Rattus</i> spp.		Oral		gestation days 0-19		maternal toxicity	LOAEL		400	NR	mg/kg/d	00084024	Smith et al. 1981			Yes
Dicamba (technical)	90	Mammal	Dog (beagle)	<i>Canis familiaris</i>		Diet		2 y	2 y	systemic	LOAEL		0.75 (m); 1.5 (f)	NR	mg/kg/d	28248	Davis et al. 1962			Yes
Dicamba NOS	86.8	Mammal	Mouse	<i>Mus</i> spp.		Diet		89 - 104 w	89 - 104 w	systemic	LOAEL		358 (m); 364 (f)	NR	mg/kg/d	40872401	Crome et al. 1987			Yes
Dicamba (technical)	86.8	Mammal	Rat	<i>Rattus</i> spp.		Diet		13 w	13 w	systemic	LOAEL		682 (m); 751 (f)	NR	mg/kg/d	128093	Laveglia 1981			Yes
Dicamba (technical)	87.7	Mammal	Rabbit - female	<i>Oryctolagus cuniculus</i>		Oral		gestation days 6-18		maternal toxicity	NOAEL		3	NR	mg/kg/d	25373	Wazeter et al. 1977			Yes
Dicamba (technical)	87.7	Mammal	Rabbit - female	<i>Oryctolagus cuniculus</i>		Oral		gestation days 6-18		developmental	NOAEL		3	NR	mg/kg/d	25373	Wazeter et al. 1977			Yes
Banvel D (technical)	87.7	Mammal	Rabbit - female	<i>Oryctolagus cuniculus</i>		Oral		gestation days 6-18		maternal toxicity	NOAEL		3	NR	mg/kg/d	28236	Goldenthal 1978 ¹²			Yes
Banvel D (technical)	87.7	Mammal	Rabbit - female	<i>Oryctolagus cuniculus</i>		Oral		gestation days 6-18		developmental	NOAEL		3	NR	mg/kg/d	28236	Goldenthal 1978 ¹²			Yes
Dicamba (technical)	90	Mammal	Rat	<i>Rattus</i> spp.		Diet		2 y	2 y	systemic	NOAEL		25	NR	mg/kg/d	28248	Davis et al. 1962			Yes
Dicamba (technical)	90	Mammal	Rat - female	<i>Rattus</i> spp.		Diet		3 m		reproductive	NOAEL	>	25	NR	mg/kg/d	28248	Davis et al. 1962			Yes
Banvel D (technical)	87.2	Mammal	Rat	<i>Rattus</i> spp.		Diet		3 gen		reproductive	NOAEL		25	NR	mg/kg/d	00028249	Witherup et al. 1966			Yes
Dicamba (technical)	NOS	Mammal	Rabbit - female	<i>Oryctolagus cuniculus</i>		Oral		gestation days 6-18	29 d	maternal toxicity	NOAEL		30	NR	mg/kg/d	42429401	Hoberman 1992			Yes
Dicamba (technical)	NOS	Mammal	Rabbit - female	<i>Oryctolagus cuniculus</i>		Oral		gestation days 6-18	29 d	developmental	NOAEL		30	NR	mg/kg/d	42429401	Hoberman 1992			Yes
Dicamba (technical)	86.9	Mammal	Rat	<i>Rattus</i> spp.		Diet		2 gen		reproductive	NOAEL		35	NR	mg/kg/d	43137101	Masters 1993			Yes
Dicamba (technical)	NOS	Mammal	Rat - female	<i>Rattus</i> spp.		Oral		gestation days 0-19		maternal toxicity	NOAEL		160	NR	mg/kg/d	00084024	Smith et al. 1981			Yes
Dicamba - sodium salt	NOS	Mammal	Rat	<i>Rattus</i> spp.		Aqueous paste		15 w	15 w	systemic	NOAEL		205	NR	mg/kg/d		Edson & Sanderson 1965			Yes
Dicamba (technical)	NOS	Mammal	Rat - female	<i>Rattus</i> spp.		Oral		gestation days 0-19		developmental	NOAEL		400	NR	mg/kg/d	00084024	Smith et al. 1981			Yes
Dicamba (technical)	90	Mammal	Dog (beagle)	<i>Canis familiaris</i>		Diet		2 y	2 y	systemic	NOAEL		0.15 (m); 0.75 (f)	NR	mg/kg/d	28248	Davis et al. 1962			Yes

Formulation	% purity a.i.	General Taxonomic Group	Common Name	Scientific Name	Age	Test Type	Means of Exposure	Exposure Duration	Test Duration	Biological Endpoint	Statistical Endpoint	Toxicity Value (tested product) ¹	Toxicity Value (ai) ¹	Units	Lab	Study Number	Data Source ²	EPA Reviewer	Date Reviewed	Used for TRV derivation
Dicamba (technical)	86.8	Mammal	Rat	<i>Rattus</i> spp.		Diet		27 m	27 m	systemic	NOAEL	107 (m); 127 (f)	NR	mg/kg/d		146150	Goldenthal 1985			Yes
Dicamba NOS	86.8	Mammal	Mouse	<i>Mus</i> spp.		Diet		89 - 104 w	89 - 104 w	systemic	NOAEL	108 (m); 121 (f)	NR	mg/kg/d		40872401	Crome et al. 1987			Yes
Dicamba (technical)	86.8	Mammal	Rat	<i>Rattus</i> spp.		Diet		13 w	13 w	systemic	NOAEL	342 (m); 392 (f)	NR	mg/kg/d		128093	Laveglia 1981			Yes
Dicamba (technical)	86.8	Mammal	Dog (beagle)	<i>Canis familiaris</i>		Diet		1 y	1 y	systemic	NOAEL	65 (m); 55 (f)	NR	mg/kg/d		40321102	Drench 1986			Yes
Banvel D		Mammal	Cattle	<i>Bos taurus</i>		Acute	Oral	5 d		mortality	NOEL	250	NR	mg/kg			Palmer & Radeleff 1964			Yes
Banvel D		Mammal	Sheep	<i>Ovis aries</i>		Acute	Oral	10 d		mortality	NOEL	250	NR	mg/kg			Palmer & Radeleff 1964			Yes
Banvel D		Mammal	Sheep	<i>Ovis aries</i>		Acute	Oral	2 d		mortality	NOEL	500	NR	mg/kg			Palmer & Radeleff 1964			Yes
Dicamba - acid	89.5	Terrestrial Plant	Onion	<i>Allium cepa</i>	Seedling	Seed emergence		14 d	14 d		EC ₂₅	NR	NR	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003 ¹⁰	M. Davy	1995	No
Dicamba - acid	89.5	Terrestrial Plant	Soybean	<i>Glycine max</i>	Seedling	Seed emergence		14 d	14 d		EC ₂₅	NR	NR	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003 ¹⁰	M. Davy	1995	No
Dicamba (technical grade)		Terrestrial Plant	Soybean	<i>Glycine max</i>	Seedling	Seed emergence					EC₂₅	NR	0.00027	lb ai/acre		43538501	Hoberg 1993a			Yes
Dicamba (technical grade)		Terrestrial Plant	Onion	<i>Allium cepa</i>	Seedling	Seed emergence					EC ₂₅	NR	0.0044	lb ai/acre		43538501	Hoberg 1993a			Yes
Dicamba - acid	89.5	Terrestrial Plant	Soybean	<i>Glycine max</i>	Juvenile plant	Vegetative vigor		14 d	14 d		EC ₂₅	NR	0.01	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Turnip	<i>Brassica rapa</i>	Juvenile plant	Vegetative vigor		14 d	14 d		EC ₂₅	NR	0.01	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Cucumber	<i>Cucumis sativus</i>	Juvenile plant	Vegetative vigor		14 d	14 d		EC ₂₅	NR	0.02	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Lettuce	<i>Lactuca sativa</i>	Juvenile plant	Vegetative vigor		14 d	14 d		EC ₂₅	NR	0.02	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Tomato	<i>Lycopersicon esculentum</i>	Juvenile plant	Vegetative vigor		14 d	14 d		EC ₂₅	NR	0.02	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Turnip	<i>Brassica rapa</i>	Seedling	Seed emergence		14 d	14 d		EC ₂₅	NR	0.04	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Tomato	<i>Lycopersicon esculentum</i>	Seedling	Seed emergence		14 d	14 d		EC ₂₅	NR	0.05	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba (technical grade)		Terrestrial Plant	Tomato	<i>Lycopersicon esculentum</i>	Seedling	Seed emergence					EC ₂₅	NR	0.054	lb ai/acre		43538501	Hoberg 1993a			Yes
Dicamba - acid	89.5	Terrestrial Plant	Onion	<i>Allium cepa</i>	Juvenile plant	Vegetative vigor		14 d	14 d		EC ₂₅	NR	0.06	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Lettuce	<i>Lactuca sativa</i>	Seedling	Seed emergence		14 d	14 d		EC ₂₅	NR	0.07	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Cabbage	<i>Brassica oleracea</i>	Juvenile plant	Vegetative vigor		14 d	14 d		EC ₂₅	NR	0.16	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Cucumber	<i>Cucumis sativus</i>	Seedling	Seed emergence		14 d	14 d		EC ₂₅	NR	0.42	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Corn	<i>Zea mays</i>	Seedling	Seed emergence		14 d	14 d		EC ₂₅	NR	0.48	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Oat	<i>Avena sativa</i>	Juvenile plant	Vegetative vigor		14 d	14 d		EC ₂₅	NR	> 0.52	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes

Formulation	% purity a.i.	General Taxonomic Group	Common Name	Scientific Name	Age	Test Type	Means of Exposure	Exposure Duration	Test Duration	Biological Endpoint	Statistical Endpoint	Toxicity Value (tested product) ¹	Toxicity Value (ai) ¹	Units	Lab	Study Number	Data Source ²	EPA Reviewer	Date Reviewed	Used for TRV derivation
Dicamba - acid	89.5	Terrestrial Plant	Ryegrass	<i>Lolium perenne</i>	Seedling	Seed emergence		14 d	14 d		EC ₂₅	NR	0.53	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Oat	<i>Avena sativa</i>	Seedling	Seed emergence		14 d	14 d		EC ₂₅	NR	0.57	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Cabbage	<i>Brassica oleracea</i>	Seedling	Seed emergence		14 d	14 d		EC ₂₅	NR	1.50	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Ryegrass	<i>Lolium perenne</i>	Juvenile plant	Vegetative vigor		14 d	14 d		EC ₂₅	NR	2.20	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Corn	<i>Zea mays</i>	Juvenile plant	Vegetative vigor		14 d	14 d		EC ₂₅	NR	> 3.9	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba (technical grade)		Terrestrial Plant	Soybean	<i>Glycine max</i>	Seedling	Seed emergence					NOEC		< 0.0022	lb ai/acre		43538501	Hoberg 1993a ⁸			Yes
Dicamba (technical grade)		Terrestrial Plant	Soybean	<i>Glycine max</i>	Juvenile plant	Vegetative vigor					NOEC	NR	< 0.004	lb ai/acre		43538501	Hoberg 1993a			Yes
Dicamba (technical grade)		Terrestrial Plant	Turnip	<i>Brassica rapa</i>	Juvenile plant	Vegetative vigor					NOEC	NR	0.0047	lb ai/acre		43538501	Hoberg 1993a			Yes
Dicamba (technical grade)		Terrestrial Plant	Turnip	<i>Brassica rapa</i>	Seedling	Seed emergence					NOEC	NR	0.016	lb ai/acre		43538501	Hoberg 1993a			Yes
Dicamba (technical grade)		Terrestrial Plant	Cucumber	<i>Cucumis sativus</i>	Juvenile plant	Vegetative vigor					NOEC	NR	0.016	lb ai/acre		43538501	Hoberg 1993a			Yes
Dicamba (technical grade)		Terrestrial Plant	Lettuce	<i>Lactuca sativa</i>	Juvenile plant	Vegetative vigor					NOEC	NR	0.016	lb ai/acre		43538501	Hoberg 1993a			Yes
Dicamba (technical grade)		Terrestrial Plant	Tomato	<i>Lycopersicon esculentum</i>	Juvenile plant	Vegetative vigor					NOEC	NR	0.016	lb ai/acre		43538501	Hoberg 1993a			Yes
Dicamba (technical grade)		Terrestrial Plant	Onion	<i>Allium cepa</i>	Seedling	Seed emergence					NOEC	NR	< 0.032	lb ai/acre		43538501	Hoberg 1993a			Yes
Dicamba (technical grade)		Terrestrial Plant	Tomato	<i>Lycopersicon esculentum</i>	Seedling	Seed emergence					NOEC	NR	0.032	lb ai/acre		43538501	Hoberg 1993a			Yes
Dicamba (technical grade)		Terrestrial Plant	Lettuce	<i>Lactuca sativa</i>	Seedling	Seed emergence					NOEC	NR	0.13	lb ai/acre		43538501	Hoberg 1993a			Yes
Dicamba (technical grade)		Terrestrial Plant	Cabbage	<i>Brassica oleracea</i>	Juvenile plant	Vegetative vigor					NOEC	NR	0.130	lb ai/acre		43538501	Hoberg 1993a			Yes
Dicamba (technical grade)		Terrestrial Plant	Corn	<i>Zea mays</i>	Seedling	Seed emergence					NOEC	NR	0.25	lb ai/acre		43538501	Hoberg 1993a			Yes
Dicamba (technical grade)		Terrestrial Plant	Cucumber	<i>Cucumis sativus</i>	Seedling	Seed emergence					NOEC	NR	0.25	lb ai/acre		43538501	Hoberg 1993a			Yes
Dicamba (technical grade)		Terrestrial Plant	Oat	<i>Avena sativa</i>	Seedling	Seed emergence					NOEC	NR	0.25	lb ai/acre		43538501	Hoberg 1993a			Yes
Dicamba (technical grade)		Terrestrial Plant	Ryegrass	<i>Lolium perenne</i>	Seedling	Seed emergence					NOEC	NR	0.25	lb ai/acre		43538501	Hoberg 1993a			Yes
Dicamba (technical grade)		Terrestrial Plant	Onion	<i>Allium cepa</i>	Juvenile plant	Vegetative vigor					NOEC	NR	0.260	lb ai/acre		43538501	Hoberg 1993a			Yes
Dicamba (technical grade)		Terrestrial Plant	Cabbage	<i>Brassica oleracea</i>	Seedling	Seed emergence					NOEC	NR	0.53	lb ai/acre		43538501	Hoberg 1993a			Yes
Dicamba (technical grade)		Terrestrial Plant	Oat	<i>Avena sativa</i>	Juvenile plant	Vegetative vigor					NOEC	NR	1.0	lb ai/acre		43538501	Hoberg 1993a			Yes
Dicamba (technical grade)		Terrestrial Plant	Ryegrass	<i>Lolium perenne</i>	Juvenile plant	Vegetative vigor					NOEC	NR	1.0	lb ai/acre		43538501	Hoberg 1993a			Yes
Dicamba (technical grade)		Terrestrial Plant	Corn	<i>Zea mays</i>	Juvenile plant	Vegetative vigor					NOEC	NR	3.9	lb ai/acre		43538501	Hoberg 1993a			Yes
Dicamba - acid	89.5	Terrestrial Plant	Turnip	<i>Brassica rapa</i>	Juvenile plant	Vegetative vigor		14 d	14 d		NOEL	NR	0.0005	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Soybean	<i>Glycine max</i>	Seedling	Seed emergence		14 d	14 d		NOEL	NR	< 0.002	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Onion	<i>Allium cepa</i>	Seedling	Seed emergence		14 d	14 d		NOEL	NR	< 0.003	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes

Formulation	% purity a.i.	General Taxonomic Group	Common Name	Scientific Name	Age	Test Type	Means of Exposure	Exposure Duration	Test Duration	Biological Endpoint	Statistical Endpoint	Toxicity Value (tested product) ¹	Toxicity Value (ai) ¹	Units	Lab	Study Number	Data Source ²	EPA Reviewer	Date Reviewed	Used for TRV derivation
Dicamba - acid	89.5	Terrestrial Plant	Soybean	<i>Glycine max</i>	Juvenile plant	Vegetative vigor		14 d	14 d		NOEL	NR	< 0.004	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Turnip	<i>Brassica rapa</i>	Seedling	Seed emergence		14 d	14 d		NOEL	NR	0.016	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Cucumber	<i>Cucumis sativus</i>	Juvenile plant	Vegetative vigor		14 d	14 d		NOEL	NR	0.016	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Lettuce	<i>Lactuca sativa</i>	Juvenile plant	Vegetative vigor		14 d	14 d		NOEL	NR	0.016	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Tomato	<i>Lycopersicon esculentum</i>	Juvenile plant	Vegetative vigor		14 d	14 d		NOEL	NR	0.016	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Tomato	<i>Lycopersicon esculentum</i>	Seedling	Seed emergence		14 d	14 d		NOEL	NR	0.032	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Onion	<i>Allium cepa</i>	Juvenile plant	Vegetative vigor		14 d	14 d		NOEL	NR	< 0.06	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Lettuce	<i>Lactuca sativa</i>	Seedling	Seed emergence		14 d	14 d		NOEL	NR	< 0.07	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Cabbage	<i>Brassica oleracea</i>	Juvenile plant	Vegetative vigor		14 d	14 d		NOEL	NR	0.13	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Corn	<i>Zea mays</i>	Seedling	Seed emergence		14 d	14 d		NOEL	NR	0.25	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Cucumber	<i>Cucumis sativus</i>	Seedling	Seed emergence		14 d	14 d		NOEL	NR	0.25	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Oat	<i>Avena sativa</i>	Seedling	Seed emergence		14 d	14 d		NOEL	NR	0.25	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Ryegrass	<i>Lolium perenne</i>	Seedling	Seed emergence		14 d	14 d		NOEL	NR	0.25	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Oat	<i>Avena sativa</i>	Juvenile plant	Vegetative vigor		14 d	14 d		NOEL	NR	0.52	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Cabbage	<i>Brassica oleracea</i>	Seedling	Seed emergence		14 d	14 d		NOEL	NR	0.53	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes

Formulation	% purity a.i.	General Taxonomic Group	Common Name	Scientific Name	Age	Test Type	Means of Exposure	Exposure Duration	Test Duration	Biological Endpoint	Statistical Endpoint	Toxicity Value (tested product) ¹	Toxicity Value (ai) ¹	Units	Lab	Study Number	Data Source ²	EPA Reviewer	Date Reviewed	Used for TRV derivation
Dicamba - acid	89.5	Terrestrial Plant	Ryegrass	<i>Lolium perenne</i>	Juvenile plant	Vegetative vigor		14 d	14 d		NOEL	NR	1.0	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes
Dicamba - acid	89.5	Terrestrial Plant	Corn	<i>Zea mays</i>	Juvenile plant	Vegetative vigor		14 d	14 d		NOEL	NR	> 3.9	lb ai/acre	Springborn Laboratory Inc., MA	42846301	USEPA 2003	M. Davy	1995	Yes

Boldface indicates study selected for derivation of toxicity reference value (TRV) used in risk assessment.

¹Toxicity values relate the dose of a compound with a potentially adverse effect. Values are reported as they were presented in the reviewed source.

²See the bibliography of this ERA document, Appendix A.1 of the associated Literature Review document, and source footnote for complete citations.

³Chemical concentration was not measured.

⁴Calculated concentrations based on % active ingredient.

⁵Test material identified as CN-11-4962 (Velsicol) with purity of 40.15% dicamba

⁶Marine species were not used to derive toxicity reference values for the risk assessment.

⁷Bluegreen algae were not used to derive toxicity reference values for the risk assessment.

⁸Estimated toxicity values were not used to derive toxicity reference values for the risk assessment.

⁹Neurotoxicity indicated by salivation.

¹⁰No effect concentration listed; not used to derive toxicity reference values for the risk assessment.

¹¹Same value listed for both rabbit & guinea pig - unknown if coincidence or error.

¹²Study used as the basis for chronic RfD for dicamba (USEPA 1992).

Abbreviations

m - male

f - female

a.i. - active ingredient

NR - Not reported

MRID - Master Record Identification Number

NOS - Not otherwise specified

Durations

hr - hours

d - days

w - weeks

m - months

y - years

Endpoints

EC₂₅ - 25% effect concentration

EC₅₀ - 50% effect concentration

IC₀ - concentration causing 0% inhibition of a process

IC₁₀₀ - concentration causing 100% inhibition of a process

IC₂₅ - concentration causing 25% inhibition of a process

IC₅₀ - concentration causing 50% inhibition of a process

LC₁₆ - lethal concentration, 16% mortality

LC₅₀ - median lethal concentration, 50% mortality

LC₇₀ - lethal concentration, 70% mortality

LC₉₅ - lethal concentration, 95% mortality

LD₅₀ - median lethal dose, 50% mortality

LOAEC - lowest-observed-adverse effect concentration

LOAEL - lowest-observed-adverse effect level

LOEC - lowest-observed-effect concentration

LOEL - lowest-observed-effect level

MATC - maximum acceptable toxicant concentration

NOAEC - no-observed-adverse effect concentration

NOAEL - no-observed-adverse effect level

NOEC - no-observed-effect concentration

NOEL - no-observed-effect level

NOS - Not otherwise specified

APPENDIX A.3

SPREADSHEET OF TOXICITY DATA FOR DIFLUFENZOPYR TRV

Formulation	% purity/a.i.	General Taxonomic Group	Common Name	Scientific Name	Age	Test Type	Means of Exposure	Exposure Duration	Test Duration	Biological Endpoint	Statistical Endpoint	Toxicity Value (tested product) ¹	Toxicity Value (ai) ¹	Units	Lab	Study Number	Year	EPA Reviewer	Date Reviewed	In USEPA 2003	Used for TRV derivation	Primary Data Source ²	
Technical	99.47	aquatic plant	Duckweed	<i>Lemna gibba</i>	NR	Acute	Water		14 d		EC ₅₀	>	0.35	NR	mg/L	Springborn Laboratory Inc., MA	MRID 44307422	1995	F. Jenkins	2000	Yes	Yes	USEPA 2003
Technical	99.47	aquatic plant	Duckweed	<i>Lemna gibba</i>	NR	Acute	Water		14 d		NOEL		0.0039	NR	mg/L	Springborn Laboratory Inc., MA	MRID 44307422	1995	F. Jenkins	2000	Yes	Yes	USEPA 2003
Diflufenzopyr	99.47	aquatic plant	Bluegreen algae	<i>Anabaena flos-aquae</i>	NR	Acute	Water		5 d		EC ₅₀		0.15	NR	mg/L	Springborn Laboratory Inc., MA	MRID 44307423	1995	K. Jenkins	2000	Yes	Yes	USEPA 2003
Diflufenzopyr	99.47	aquatic plant	Bluegreen algae	<i>Anabaena flos-aquae</i>	NR	Acute	Water		5 d		NOEL		0.14	NR	mg/L	Springborn Laboratory Inc., MA	MRID 44307423	1995	K. Jenkins	2000	Yes	Yes	USEPA 2003
Diflufenzopyr	99.47	aquatic plant	Green Algae		NR	Acute	Water		5 d		EC₅₀		0.1	NR	mg/L	Springborn Laboratory Inc., MA	MRID 44307425	1995	K. Jenkins	2000	Yes	Yes	USEPA 2003
Diflufenzopyr	99.47	aquatic plant	Green Algae		NR	Acute	Water		5 d		NOEL		0.0078	NR	mg/L	Springborn Laboratory Inc., MA	MRID 44307425	1995	K. Jenkins	2000	Yes	Yes	USEPA 2003
Diflufenzopyr	99.47	aquatic plant	Freshwater diatom		NR	Acute	Water		5 d		EC ₅₀		0.1	NR	mg/L	Springborn Laboratory Inc., MA	MRID 44307424	1995	K. Jenkins	2000	Yes	Yes	USEPA 2003
Diflufenzopyr	99.47	aquatic plant	Freshwater diatom		NR	Acute	Water		5 d		EC ₂₅		0.14	NR	mg/L	Springborn Laboratory Inc., MA	MRID 44307424	1995	K. Jenkins	2000	Yes	Yes	Health Canada 1999
Diflufenzopyr	99.47	aquatic plant	Freshwater diatom		NR	Acute	Water		5 d		NOEL		0.003	NR	mg/L	Springborn Laboratory Inc., MA	MRID 44307424	1995	K. Jenkins	2000	Yes	Yes	USEPA 2003
Diflufenzopyr	99.47	aquatic plant	Marine diatom		NR	Acute	Water		5 d		EC ₅₀		0.12	NR	mg/L	Springborn Laboratory Inc., MA	MRID 44307426	1995	K. Jenkins	2000	Yes	Yes	USEPA 2003
Diflufenzopyr	99.47	aquatic plant	Marine diatom		NR	Acute	Water		5 d		NOEL		0.0064	NR	mg/L	Springborn Laboratory Inc., MA	MRID 44307426	1995	K. Jenkins	2000	Yes	Yes	USEPA 2003
Diflufenzopyr	94.7	bird	Mallard Duck	<i>Anas platyrhynchos</i>	10 days	Acute	Diet		8 d		LC₅₀	>	5,620	NR	ppm	Wildlife International	MRID 44170131	1993	N. Mastrota	1994	Yes	Yes	USEPA 2003
Diflufenzopyr	94.7	bird	Mallard Duck	<i>Anas platyrhynchos</i>	10 days	Acute	Diet		8 d		NOEL		5,620	NR	ppm	Wildlife International	MRID 44170131	1993	N. Mastrota		Yes	Yes	USEPA 2003
Diflufenzopyr	94.7	bird	Bobwhite quail	<i>Colinus virginianus</i>	24 weeks	Acute	Oral		14 d		LC ₅₀	>	2,250	NR	mg/kg BW	Wildlife International	MRID 44170132	1993	N. Mastrota	1994	Yes	Yes	USEPA 2003
Diflufenzopyr	94.7	bird	Bobwhite quail	<i>Colinus virginianus</i>	24 weeks	Acute	Oral		14 d		NOEL		2,250	NR	mg/kg BW	Wildlife International	MRID 44170132	1993	N. Mastrota	1994	Yes	Yes	USEPA 2003
Diflufenzopyr	94.7	bird	Bobwhite quail	<i>Colinus virginianus</i>	10 days	Acute	Diet		8 d		LC₅₀	>	5,620	NR	ppm	Wildlife International	MRID 44170131	1993	N. Mastrota	1994	Yes	Yes	USEPA 2003
Diflufenzopyr	94.7	bird	Bobwhite quail	<i>Colinus virginianus</i>	10 days	Acute	Diet		8 d		NOEL		5,620	NR	ppm	Wildlife International	MRID 44170131	1993	N. Mastrota	1994	Yes	Yes	USEPA 2003
Diflufenzopyr	80	bird	Bobwhite quail	<i>Colinus virginianus</i>	10 days	Acute	Diet		8 d		LD ₅₀	>	1,240	NR	ppm	Wildlife International	MRID 45040202	2001	DYN	2001	Yes	Yes	USEPA 2003
Diflufenzopyr	80	bird	Bobwhite quail	<i>Colinus virginianus</i>	10 days	Acute	Diet		8 d		NOEL		1,240	NR	ppm	Wildlife International	MRID 45040202	2001	DYN	2001	Yes	Yes	USEPA 2003
Diflufenzopyr	94.3	bird	Marine diatom	<i>Anas platyrhynchos</i>	early life	Chronic	Reproduction		21 w		LOEL	>	1,050	NR	ppm	Wildlife International	MRID 45310903	2001	DYN	2001	Yes	Yes	USEPA 2003
Diflufenzopyr	94.3	bird	Mallard Duck	<i>Anas platyrhynchos</i>	early life	Chronic	Reproduction		21 w		NOEL		1,050	NR	ppm	Wildlife International	MRID 45310903	2001	DYN	2001	Yes	Yes	USEPA 2003
Diflufenzopyr	94.3	bird	Bobwhite quail	<i>Colinus virginianus</i>	10 days	Chronic	Diet		20 w		LOEL	>	1,050	NR	ppm	Wildlife International	MRID 45310902	2001	DYN	2001	Yes	Yes	USEPA 2003
Diflufenzopyr	94.3	bird	Bobwhite quail	<i>Colinus virginianus</i>	10 days	Chronic	Diet		20 w		NOEL		1,050	NR	ppm	Wildlife International	MRID 45310902	2001	DYN	2001	Yes	Yes	USEPA 2003
Diflufenzopyr	94.7	aquatic invertebrate	Water flea	<i>Daphnia magna</i>	<24 hr	Acute	Water	48 hr	48 hr	mortality	EC ₅₀		15	NR	mg/L	Wildlife International	MRID 44170135	1992	N. Mastroda	1994	Yes	Yes	USEPA 2003
Diflufenzopyr	94.7	aquatic invertebrate	Water flea	<i>Daphnia magna</i>	<24 hr	Acute	Water	48 hr	48 hr	mortality	NOEL		9.7	NR	mg/L	Wildlife International	MRID 44170135	1992	N. Mastroda	1994	Yes	Yes	USEPA 2003
Diflufenzopyr	97.4	fish	Bluegill Sunfish	<i>Lepomis macrochirus</i>	0.47 g	Acute	Water	96 hours			LC₅₀	>	135	NR	mg/L	Wildlife International	MRID 44170133	1992	N. Mastroda	1994	Yes	Yes	USEPA 2003
Diflufenzopyr	97.4	fish	Bluegill Sunfish	<i>Lepomis macrochirus</i>	0.47 g	Acute	Water	96 hours			NOEL		16	NR	mg/L	Wildlife International	MRID 44170133	1992	N. Mastroda	1994	Yes	Yes	USEPA 2003
Diflufenzopyr	94.7	fish	Rainbow Trout	<i>Oncorhynchus mykiss</i>	0.2 g	Acute	Water	96 hours			LC₅₀		106	NR	mg/L	Wildlife International	MRID 44170134	1992	N. Mastroda	1994	Yes	Yes	USEPA 2003
Diflufenzopyr	94.7	fish	Rainbow Trout	<i>Oncorhynchus mykiss</i>	0.2 g	Acute	Water	96 hours			NOEL		80	NR	mg/L	Wildlife International	MRID 44170134	1992	N. Mastroda	1994	Yes	Yes	USEPA 2003
Diflufenzopyr	98.1	fish	Sheepshead minnow	<i>Cyprinodon variegatus</i>	0.18 g	Acute	Water	96 hours			LC ₅₀	>	138	NR	mg/L	Wildlife International	MRID 44170136	1994	N. Mastroda	1994	Yes	Yes	USEPA 2003
Diflufenzopyr	98.1	fish	Sheepshead minnow	<i>Cyprinodon variegatus</i>	0.18 g	Acute	Water	96 hours			NOEL		138	NR	mg/L	Wildlife International	MRID 44170136	1994	N. Mastroda	1994	Yes	Yes	USEPA 2003
Diflufenzopyr	99.47	insect	Honey bee	<i>Apis mellifera</i>	adult	Acute	Dermal		48 hr		LD ₅₀	>	25	NR	ug/bee	Springborn Laboratory Inc., MA	MRID 44307428	1995	F. Jenkins	2000	Yes	Yes	USEPA 2003
Diflufenzopyr	99.47	insect	Honey bee	<i>Apis mellifera</i>	adult	Acute	Dermal		48 hr		NOEL		25	NR	ug/bee	Springborn Laboratory Inc., MA	MRID 44307428	1995	F. Jenkins	2000	Yes	Yes	USEPA 2003
Technical	96.4	mammal	Rabbit			Acute	Dermal				LD₅₀	>	5000	NR	mg/kg BW					No	Yes	USEPA 1999	

Formulation	% purity/a.i.	General Taxonomic Group	Common Name	Scientific Name	Age	Test Type	Means of Exposure	Exposure Duration	Test Duration	Biological Endpoint	Statistical Endpoint	Toxicity Value (tested product) ¹	Toxicity Value (ai) ¹	Units	Lab	Study Number	Year	EPA Reviewer	Date Reviewed	In USEPA 2003	Used for TRV derivation	Primary Data Source ²
Technical	98	mammal	Dog		males	Chronic	Diet		1 y		LOAEL	7500 (299)	NR	ppm (mg/kg/d)						No	Yes	USEPA 1999
Technical	98	mammal	Dog		females	Chronic	Diet		1 y		LOAEL	7500 (301)	NR	ppm (mg/kg/d)						No	Yes	USEPA 1999
Technical	98	mammal	Dog		males	Chronic	Diet		1 y		NOEL	750 (26)	NR	ppm (mg/kg/d)						No	Yes	USEPA 1999
Technical	98	mammal	Dog		females	Chronic	Diet		1 y		NOEL	750 (28)	NR	ppm (mg/kg/d)						No	Yes	USEPA 1999
Technical		mammal	Rat			Chronic	Diet		2-generation	reproduction	LOAEL	8000 (466.2)	NR	ppm (mg/kg/d)						No	Yes	USEPA 1999
Technical	98.1	mammal	Rabbit			Developmental	Oral	gestation days 6-19		maternal effects	LOAEL	100	NR	mg/kg/d						No	Yes	USEPA 1999
Diflufenzopyr		mammal	Dog		males	Chronic	Diet		13 w		NOAEL	1500 (58)	NR	ppm (mg/kg/d)						No	Yes	USEPA 1999
Diflufenzopyr		mammal	Dog		females	Chronic	Diet		13 w		NOAEL	1500 (59)	NR	ppm (mg/kg/d)						No	Yes	USEPA 1999
Technical	98.1	mammal	Rabbit			Developmental	Oral	gestation days 6-19		maternal effects	NOEL	30	NR	mg/kg/d						No	Yes	USEPA 1999
Technical	96.4	mammal	Rabbit			Chronic	Dermal		21-24 d	systemic	NOAEL	1000	NR	mg/kg/d						No	Yes	USEPA 1999
Technical		mammal	Rat			Chronic	Diet		2-generation	reproduction	NOAEL	2000 (113.1)	NR	ppm (mg/kg/d)						No	Yes	USEPA 1999
Technical	96.4	mammal	Rat			Acute	Oral				LD ₅₀	> 5000	NR	mg/kg BW						No	Yes	USEPA 1999
Technical	96	mammal	Rat		males	Chronic	Diet		13 w		NOEL	5000 (352)	NR	ppm (mg/kg/d)						No	Yes	USEPA 1999
Technical	96	mammal	Rat		females	Chronic	Diet		13 w		NOEL	5000 (431)	NR	ppm (mg/kg/d)						No	Yes	USEPA 1999
Technical		mammal	Rat		females	Chronic	Diet		13 w	weight	LOEL	10000	NR	ppm						No	Yes	USEPA 1999
Diflufenzopyr	97.1	mammal	Mouse		males	Chronic	Diet		13 w		NOEL	7000 (1225)	NR	ppm (mg/kg/d)						No	Yes	USEPA 1999
Diflufenzopyr	97.1	mammal	Mouse		females	Chronic	Diet		13 w		NOEL	7000 (1605)	NR	ppm (mg/kg/d)						No	Yes	Health Canada 1999
Diflufenzopyr		mammal	Dog		males	Chronic	Diet		13 w		LOAEL	10000 (403)	NR	ppm (mg/kg/d)						No	Yes	USEPA 1999
Diflufenzopyr		mammal	Dog		females	Chronic	Diet		13 w		LOAEL	10000 (424)	NR	ppm (mg/kg/d)						No	Yes	USEPA 1999
Technical	98.1	mammal	Mouse		males	Chronic	Diet		78 w		NOEL	7000 (1037)	NR	ppm (mg/kg/d)						No	Yes	USEPA 1999
Technical	98.1	mammal	Mouse		females	Chronic	Diet		78 w		NOEL	7000 (1004)	NR	ppm (mg/kg/d)						No	Yes	USEPA 1999
Technical	97.1 to 99.6	mammal	Rat		males	Chronic	Diet		2 y	weight	NOEL	5000 (236)	NR	ppm (mg/kg/d)						No	Yes	USEPA 1999
Technical	97.1 to 99.6	mammal	Rat		females	Chronic	Diet		2 y	weight	NOEL	5000 (323)	NR	ppm (mg/kg/d)						No	Yes	USEPA 1999
Technical	97.1 to 99.6	mammal	Rat			Chronic	Diet		2 y	weight	LOEL	10000	NR	ppm						No	Yes	USEPA 1999
Technical	98.1	mammal	Rat			Developmental	Oral gavage	gestation days 6-15		maternal effects	NOEL	300	NR	mg/kg/d						No	Yes	USEPA 1999
Technical	98.1	mammal	Rat			Developmental	Oral gavage	gestation days 6-15		maternal effects	LOEL	1000	NR	mg/kg/d						No	Yes	USEPA 1999
Technical	98.1	mammal	Rat			Developmental	Oral gavage	gestation days 6-15		fetal effects	NOEL	300	NR	mg/kg/d						No	Yes	USEPA 1999
Technical	98.1	mammal	Rat			Developmental	Oral gavage	gestation days 6-15		fetal effects	LOEL	1000	NR	mg/kg/d						No	Yes	USEPA 1999
Technical	98.1	mammal	Rabbit			Developmental	Oral	gestation days 6-19		fetal effects	LOAEL	300	NR	mg/kg/d						No	Yes	USEPA 1999
Technical	98.1	mammal	Rabbit			Developmental	Oral	gestation days 6-19		fetal effects	NOEL	100	NR	mg/kg/d						No	Yes	USEPA 1999
Technical	98.1	mammal	Rat			Chronic	Diet		2-generation	systemic	LOAEL	2000 (113.1)	NR	ppm (mg/kg/d)						No	Yes	USEPA 1999
Technical	98.1	mammal	Rat			Chronic	Diet		2-generation	systemic	NOEL	500 (27.3)	NR	ppm (mg/kg/d)						No	Yes	USEPA 1999
Technical	96.4	mammal	Rat			Chronic	Oral gavage			neurotoxicity	NOEL	2000	NR	mg/kg BW						No	Yes	USEPA 1999
Technical	96.4	mammal	Rat			Chronic	Diet		13 w	neurotoxicity	NOEL	1000	NR	mg/kg/d						No	Yes	USEPA 1999
Technical	96.4	mammal	Rat			Chronic	Diet		13 w	weight	NOEL	1000	NR	mg/kg/d						No	Yes	USEPA 1999
Technical	96.4	mammal	Rat			Chronic	Diet		13 w	weight	NOEL	75	NR	mg/kg/d						No	Yes	USEPA 1999
Technical	98	mammal	Dog			Chronic	Diet		90 d		NOEL	1500 (58)	NR	ppm (mg/kg/d)						No	Yes	Health Canada 1999
Technical	98	mammal	Dog			Chronic	Diet		90 d			10000	NR	ppm						No	Yes	Health Canada 1999

Formulation	% purity/a.i.	General Taxonomic Group	Common Name	Scientific Name	Age	Test Type	Means of Exposure	Exposure Duration	Test Duration	Biological Endpoint	Statistical Endpoint	Toxicity Value (tested product) ¹	Toxicity Value (ai) ¹	Units	Lab	Study Number	Year	EPA Reviewer	Date Reviewed	In USEPA 2003	Used for TRV derivation	Primary Data Source ²
Diflufenzopyr	98.1	aquatic invertebrates - marine	Mysid	<i>Mysidopsis bahia</i>	<24 hr	Acute	Water		96 hr		LC ₅₀	19	NR	mg/L	Wildlife International	MRID 44170138	1994	N. Mastroda	1995	Yes	Yes	USEPA 2003
Diflufenzopyr	98.1	aquatic invertebrates - marine	Mysid	<i>Mysidopsis bahia</i>	<24 hr	Acute	Water		96 hr		LC ₅₀	19	NR	mg/L	Wildlife International	MRID 44170138	1994	N. Mastroda	1995	Yes	Yes	USEPA 2003
Diflufenzopyr	98.1	aquatic invertebrates - marine	Eastern oyster	<i>Crassostrea virginica</i>	spat	Acute	Water		96 hr		EC ₅₀	61	NR	mg/L	Wildlife International	MRID 44170137	1995	N. Mastroda	1995	Yes	Yes	USEPA 2003
Diflufenzopyr	98.1	aquatic invertebrates - marine	Eastern oyster	<i>Crassostrea virginica</i>	spat	Acute	Water		96 hr		NOEL	31	NR	mg/L	Wildlife International	MRID 44170137	1995	N. Mastroda	1995	Yes	Yes	USEPA 2003
Diflufenzopyr		terrestrial invertebrate	earthworm			Acute	soil		14 d		LC ₅₀	> 1000	NR	mg/kg soil						Yes	Yes	Health Canada 1999
Diflufenzopyr		terrestrial invertebrate	earthworm			Acute	soil		14 d		NOEC	500	NR	mg/kg soil						Yes	Yes	Health Canada 1999
Diflufenzopyr		terrestrial plant	Turnip			Seed emergence			14 d		EC₂₅	NR	0.0008	lb a.i./acre						No	Yes	USEPA 1999
Diflufenzopyr	86.5	terrestrial plant	Lettuce	<i>Lactuca sativa</i>	Seedling	Seed emergence			14 d		NOEL	NR	0.0002	lb a.i./acre	Springborn Laboratory Inc., MA	MRID 44307421	1995	M. Davy	2000	Yes	Yes	USEPA 2003
Diflufenzopyr	86.5	terrestrial plant	Turnip			Seed emergence					EC ₅₀	NR	0.0008	lb a.i./acre	Springborn Laboratory Inc., MA	MRID 44307421	1995	M. Davy	2000	Yes	Yes	USEPA 2003
Diflufenzopyr	86.5	terrestrial plant	Tomato	<i>Lycopersicon esculentum</i>	Seedling	Seed emergence			14 d		EC ₂₅	NR	0.04	lb a.i./acre	Springborn Laboratory Inc., MA	MRID 44307421	1995	M. Davy	2000	Yes	Yes	USEPA 2003
Diflufenzopyr	86.5	terrestrial plant	Turnip			Seed emergence					NOEL	NR	0.0001	lb a.i./acre	Springborn Laboratory Inc., MA	MRID 44307421	1995	M. Davy	2000	Yes	Yes	USEPA 2003
Diflufenzopyr	86.5	terrestrial plant	Ryegrass	<i>Lolium perenne</i>	Seedling	Seed emergence			14 d		EC ₂₅	NR	0.01	lb a.i./acre	Springborn Laboratory Inc., MA	MRID 44307421	1995	M. Davy	2000	Yes	Yes	USEPA 2003
Diflufenzopyr	86.5	terrestrial plant	Ryegrass	<i>Lolium perenne</i>	Seedling	Seed emergence			14 d		NOEL	NR	0.0018	lb a.i./acre	Springborn Laboratory Inc., MA	MRID 44307421	1995	M. Davy	2000	Yes	Yes	USEPA 2003
Diflufenzopyr	86.5	terrestrial plant	Cabbage	<i>Brassica oleracea</i>	Seedling	Seed emergence			14 d		EC ₂₅	NR	0.01	lb a.i./acre	Springborn Laboratory Inc., MA	MRID 44307421	1995	M. Davy	2000	Yes	Yes	USEPA 2003
Diflufenzopyr	86.5	terrestrial plant	Cabbage	<i>Brassica oleracea</i>	Seedling	Seed emergence			14 d		NOEL	NR	0.0036	lb a.i./acre	Springborn Laboratory Inc., MA	MRID 44307421	1995	M. Davy	2000	Yes	Yes	USEPA 2003
Diflufenzopyr	86.5	terrestrial plant	Cucumber	<i>Cucumis sativus</i>	Seedling	Seed emergence			14 d		NOEL	NR	0.0018	lb a.i./acre	Springborn Laboratory Inc., MA	MRID 44307421	1995	M. Davy	2000	Yes	Yes	USEPA 2003
Diflufenzopyr	86.5	terrestrial plant	Soybean	<i>Glycine max</i>	Seedling	Seed emergence			14 d		NOEL	NR	0.0018	lb a.i./acre	Springborn Laboratory Inc., MA	MRID 44307421	1995	M. Davy	2000	Yes	Yes	USEPA 2003
Diflufenzopyr	86.5	terrestrial plant	Tomato	<i>Lycopersicon esculentum</i>	Seedling	Seed emergence			14 d		NOEL	NR	0.028	lb a.i./acre	Springborn Laboratory Inc., MA	MRID 44307421	1995	M. Davy	2000	Yes	Yes	USEPA 2003
Diflufenzopyr	86.5	terrestrial plant	Corn	<i>Zea mays</i>	Seedling	Seed emergence			14 d		EC ₂₅	NR	0.01	lb a.i./acre	Springborn Laboratory Inc., MA	MRID 44307421	1995	M. Davy	2000	Yes	Yes	USEPA 2003
Diflufenzopyr	86.5	terrestrial plant	Corn	<i>Zea mays</i>	Seedling	Seed emergence			14 d		NOEL	NR	0.003	lb a.i./acre	Springborn Laboratory Inc., MA	MRID 44307421	1995	M. Davy	2000	Yes	Yes	USEPA 2003
Diflufenzopyr	86.5	terrestrial plant	Oat	<i>Avena sativa</i>	Seedling	Seed emergence			14 d		EC ₂₅	NR	0.03	lb a.i./acre	Springborn Laboratory Inc., MA	MRID 44307421	1995	M. Davy	2000	Yes	Yes	USEPA 2003
Diflufenzopyr	86.5	terrestrial plant	Oat	<i>Avena sativa</i>	Seedling	Seed emergence			14 d		NOEL	NR	0.004	lb a.i./acre	Springborn Laboratory Inc., MA	MRID 44307421	1995	M. Davy	2000	Yes	Yes	USEPA 2003
Diflufenzopyr	86.5	terrestrial plant	Onion	<i>Allium cepa</i>	Seedling	Seed emergence			14 d		EC ₂₅	NR	0.09	lb a.i./acre	Springborn Laboratory Inc., MA	MRID 44307421	1995	M. Davy	2000	Yes	Yes	USEPA 2003
Diflufenzopyr	86.5	terrestrial plant	Onion	<i>Allium cepa</i>	Seedling	Seed emergence			14 d		NOEL	NR	0.0018	lb a.i./acre	Springborn Laboratory Inc., MA	MRID 44307421	1995	M. Davy	2000	Yes	Yes	USEPA 2003
Diflufenzopyr	20.4	terrestrial plant	Tomato	<i>Lycopersicon esculentum</i>	Juvenile plant	Vegetative vigor			21 d		EC ₂₅	NR	0.01	lb a.i./acre	ABC	MRID 45047301	2000	DYN	2001	Yes	Yes	USEPA 2003
Diflufenzopyr	20.4	terrestrial plant	Tomato	<i>Lycopersicon esculentum</i>	Juvenile plant	Vegetative vigor			21 d		NOEL	NR	0.0039	lb a.i./acre	ABC	MRID 45047301	2000	DYN	2001	Yes	Yes	USEPA 2003
Diflufenzopyr	20.4	terrestrial plant	Ryegrass	<i>Lolium perenne</i>	Juvenile plant	Vegetative vigor			21 d		EC ₂₅	NR	0.38	lb a.i./acre	ABC	MRID 45047301	2000	DYN	2001	Yes	Yes	USEPA 2003
Diflufenzopyr	20.4	terrestrial plant	Ryegrass	<i>Lolium perenne</i>	Juvenile plant	Vegetative vigor			21 d		NOEL	NR	0.248	lb a.i./acre	ABC	MRID 45047301	2000	DYN	2001	Yes	Yes	USEPA 2003
Diflufenzopyr		terrestrial plant	Ryegrass	<i>Lolium perenne</i>		shoot length					EC ₂₅	NR	0.0055	lb a.i./acre						No	Yes	USEPA 1999
manufacturing use product	93	mammal	Rat		males	Acute	Oral				LD ₅₀	4800	NR	mg/kg BW						No	Yes	USEPA 1999
manufacturing use product	93	mammal	Rat		females	Acute	Oral				LD₅₀	3300	NR	mg/kg BW						No	Yes	USEPA 1999
manufacturing use product		mammal	Rabbit			Acute	Dermal				LD ₅₀	> 5000	NR	mg/kg BW						No	Yes	USEPA 1999

Boldface indicates study selected for derivation of toxicity reference value (TRV) used in risk assessment.

Formulation	% purity/a.i.	General Taxonomic Group	Common Name	Scientific Name	Age	Test Type	Means of Exposure	Exposure Duration	Test Duration	Biological Endpoint	Statistical Endpoint	Toxicity Value (tested product) ¹	Toxicity Value (ai) ¹	Units	Lab	Study Number	Year	EPA Reviewer	Date Reviewed	In USEPA 2003	Used for TRV derivation	Primary Data Source ²
-------------	------------------	-------------------------------	----------------	-----------------	-----	-----------	----------------------	----------------------	------------------	------------------------	-------------------------	---	-------------------------------------	-------	-----	--------------	------	-----------------	---------------	------------------	----------------------------	-------------------------------------

¹Toxicity values relate the dose of a compound with a potentially adverse effect. Values are reported as they were presented in the reviewed source.

²See the bibliography of this ERA document, Appendix A of the associated Literature Review document, and source footnote for complete citations.

Abbreviations

a.i. - active ingredient
 BW - body weight
 CI - confidence interval
 f - female
 m - male
 MRID - Master Record Identification Number
 ppb - parts per billion
 ppm - parts per million
 TRV - Toxicity Reference Value
 ug - micrograms
 NR - Not reported

End points

EC₂₅ - 25% effect concentration
 EC₅₀ - 50% effect concentration
 IC₀ - concentration causing 0% inhibition of a process
 IC₁₀₀ - concentration causing 100% inhibition of a process
 IC₂₅ - concentration causing 25% inhibition of a process
 IC₅₀ - concentration causing 50% inhibition of a process
 LC₁₆ - lethal concentration, 16% mortality
 LC₅₀ - median lethal concentration, 50% mortality
 LC₇₀ - lethal concentration, 70% mortality
 LC₉₅ - lethal concentration, 95% mortality
 LD₅₀ - median lethal dose, 50% mortality
 LOAEC - lowest-observable-adverse effect concentration
 LOAEL - lowest-observable-adverse effect level
 LOEC - lowest-observable-effect concentration
 LOEL - lowest-observable-effect level
 MATC - maximum acceptable toxicant concentration
 NOAEC - no-observable-adverse effect concentration
 NOAEL - no-observable-adverse effect level
 NOEC - no-observable-effect concentration
 NOEL - no-observable-effect level

Durations

hr - hours
 d - days
 w - weeks
 mo - months
 y - years

APPENDIX A.4

SPREADSHEET OF TOXICITY DATA FOR OVERDRIVE TRV

Formulation ¹	% purity ai ⁵	General Taxonomic Group	Common Name	Scientific Name	Age	Test Type	Means of Exposure	Exposure Duration	Test Duration	Biological Endpoint	Statistical Endpoint	Toxicity Value (tested product) ¹	Units	Lab	Study Number	Year	EPA Reviewer	Date Reviewed	In USEPA 2003	Used for TRV derivation	Primary Data Source ³
Distinct		aquatic plant	Duckweed	<i>Lemna gibba</i>		Chronic	Water		14 d		EC ₂₅	0.0029	mg/L						No	Yes	Health Canada 1999
Distinct		aquatic plant	Duckweed	<i>Lemna gibba</i>			Water		14 d		EC₅₀	0.11	mg/L						No	Yes	Health Canada 1999
Distinct	50/20	aquatic plant	Duckweed	<i>Lemna gibba</i>	N.R.	Acute	Water		14 d	Growth Reg.	EC ₅₀	0.22	mg/L	Springborn Laboratory Inc., MA	MRID 44307451	1996	F. Jenkins	1997	Yes	Yes	USEPA 2003
Distinct	50/20	aquatic plant	Bluegreen algae ⁴	<i>Anabaena flos- aquae</i>	N.R.	Acute	Water		5 d	Growth Reg.	EC ₅₀	> 0.26	mg/L	Springborn Laboratory Inc., MA	MRID 44307450	1996	F. Jenkins	1997	Yes	No	USEPA 2003
Distinct		aquatic plant	Duckweed	<i>Lemna gibba</i>		Chronic	Water		14 d		NOEL	0.0023	mg/L						No	Yes	Health Canada 1999
Distinct	50/20	aquatic plant	Duckweed	<i>Lemna gibba</i>	NR	Acute	Water		14 d	Growth Reg.	NOEL	0.0023	mg/L	Springborn Laboratory Inc., MA	MRID 44307451	1996	F. Jenkins	1997	Yes	Yes	USEPA 2003
Distinct	50/20	aquatic plant	Bluegreen algae ⁴	<i>Anabaena flos- aquae</i>	N.R.	Acute	Water		5 d	Growth Reg.	NOEL	0.0059	mg/L	Springborn Laboratory Inc., MA	MRID 44307450	1996	F. Jenkins	1997	Yes	No	USEPA 2003
Distinct	49/20.4	aquatic invertebrate	Water flea	<i>Daphnia magna</i>	<24 hr	Acute	Water	48 hr	48 hr	mortality	EC ₅₀	> 130	mg/L	Wildlife International	MRID 45310903	2001	M. Mahoney	2002	Yes	Yes	USEPA 2003
Distinct	49/20.4	aquatic invertebrate	Water flea	<i>Daphnia magna</i>	<24 hr	Acute	Water	48 hr	48 hr	mortality	NOEL	130	mg/L	Wildlife International	MRID 45310903	2001	M. Mahoney	2002	Yes	Yes	USEPA 2003
Distinct		mammal	Rat	<i>Rattus spp.</i>	males	Acute	Oral				LD₅₀	1,600	mg/kg BW						No	Yes	USEPA 1999
Distinct		mammal	Rabbit	<i>Oryctolagus cuniculus</i>		Acute	Dermal				LD₅₀	> 5,000	mg/kg BW						No	Yes	USEPA 1999
Distinct		mammal	Rat	<i>Rattus spp.</i>	females	Acute	Oral				LD ₅₀	2,100	mg/kg BW						No	Yes	USEPA 1999
Distinct	50/20	terrestrial plant	Ryegrass	<i>Lolium perenne</i>	Seedling	Seed emergence		14 day	14 day	shoot height	EC ₂₅	0.05	lb/acre	Springborn Laboratory Inc., MA	MRID 44307452	1996	M. Davy	2000	Yes	Yes	USEPA 2003
Distinct	50/20	terrestrial plant	Cabbage	<i>Brassica oleracea</i>	Seedling	Seed emergence		14 day	14 day	phytotoxicity	EC ₂₅	0.02	lb/acre	Springborn Laboratory Inc., MA	MRID 44307452	1996	M. Davy	2000	Yes	Yes	USEPA 2003
Distinct	50/20	terrestrial plant	Cucumber	<i>Cucumis sativus</i>	Seedling	Seed emergence		14 day	14 day	phytotoxicity	EC ₂₅	0.01	lb/acre	Springborn Laboratory Inc., MA	MRID 44307452	1996	M. Davy	2000	Yes	Yes	USEPA 2003
Distinct	50/20	terrestrial plant	Lettuce	<i>Lactuca sativa</i>	Seedling	Seed emergence		14 day	14 day		EC ₂₅	0.01	lb/acre	Springborn Laboratory Inc., MA	MRID 44307452	1996	M. Davy	2000	Yes	Yes	USEPA 2003
Distinct	50/20	terrestrial plant	Tomato	<i>Lycopersicon esculentum</i>	Seedling	Seed emergence		14 day	14 day	shoot height	EC ₂₅	0.02	lb/acre	Springborn Laboratory Inc., MA	MRID 44307452	1996	M. Davy	2000	Yes	Yes	USEPA 2003
Distinct	50/20	terrestrial plant	Turnip	<i>Brassica rapa</i>	Seedling	Seed emergence		14 day	14 day	Growth Reg.	EC₂₅	0.0043	lb/acre	Springborn Laboratory Inc., MA	MRID 44307452	1996	KBN	1997	No	Yes	Health Canada 1999
Distinct	50/20	terrestrial plant	Corn	<i>Zea mays</i>	Seedling	Seed emergence		14 day	14 day	shoot height	EC ₂₅	0.08	lb/acre	Springborn Laboratory Inc., MA	MRID 44307452	1996	M. Davy	2000	Yes	Yes	USEPA 2003
Distinct	50/20	terrestrial plant	Oat	<i>Avena sativa</i>	Seedling	Seed emergence		14 day	14 day	shoot height	EC ₂₅	0.16	lb/acre	Springborn Laboratory Inc., MA	MRID 44307452	1996	M. Davy	2000	Yes	Yes	USEPA 2003
Distinct	50/20	terrestrial plant	Onion	<i>Allium cepa</i>	Seedling	Seed emergence		14 day	14 day	shoot height	EC ₂₅	0.07	lb/acre	Springborn Laboratory Inc., MA	MRID 44307452	1996	M. Davy	2000	Yes	Yes	USEPA 2003
Distinct	50/20	terrestrial plant	Ryegrass	<i>Lolium perenne</i>	Seedling	Seed emergence		14 day	14 day	shoot height	NOEL	0.024	lb/acre	Springborn Laboratory Inc., MA	MRID 44307452	1996	M. Davy	2000	Yes	Yes	USEPA 2003
Distinct	50/20	terrestrial plant	Cabbage	<i>Brassica oleracea</i>	Seedling	Seed emergence		14 day	14 day	phytotoxicity	NOEL	0.008	lb/acre	Springborn Laboratory Inc., MA	MRID 44307452	1996	M. Davy	2000	Yes	Yes	USEPA 2003
Distinct	50/20	terrestrial plant	Cucumber	<i>Cucumis sativus</i>	Seedling	Seed emergence		14 day	14 day	phytotoxicity	NOEL	0.0016	lb/acre	Springborn Laboratory Inc., MA	MRID 44307452	1996	M. Davy	2000	Yes	Yes	USEPA 2003

Formulation ¹	% purity ai ⁵	General Taxonomic Group	Common Name	Scientific Name	Age	Test Type	Means of Exposure	Exposure Duration	Test Duration	Biological Endpoint	Statistical Endpoint	Toxicity Value (tested product) ¹	Units	Lab	Study Number	Year	EPA Reviewer	Date Reviewed	In USEPA 2003	Used for TRV derivation	Primary Data Source ³
Distinct	50/20	terrestrial plant	Lettuce	<i>Lactuca sativa</i>	Seedling	Seed emergence		14 day	14 day		NOEL	0.0049	lb/acre	Springborn Laboratory Inc., MA	MRID 44307452	1996	M. Davy	2000	Yes	Yes	USEPA 2003
Distinct	50/20	terrestrial plant	Soybean	<i>Glycine max</i>	Seedling	Seed emergence		14 day	14 day	phytotoxicity	NOEL	0.0032	lb/acre	Springborn Laboratory Inc., MA	MRID 44307452	1996	M. Davy	2000	Yes	Yes	USEPA 2003
Distinct	50/20	terrestrial plant	Tomato	<i>Lycopersicon esculentum</i>	Seedling	Seed emergence		14 day	14 day	shoot height	NOEL	0.006	lb/acre	Springborn Laboratory Inc., MA	MRID 44307452	1996	M. Davy	2000	Yes	Yes	USEPA 2003
Distinct	50/20	terrestrial plant	Turnip	<i>Brassica rapa</i>	Seedling	Seed emergence		14 day	14 day	phytotoxicity	NOEL	0.003	lb/acre	Springborn Laboratory Inc., MA	MRID 44307452	1996	M. Davy	2000	Yes	Yes	USEPA 2003
Distinct	50/20	terrestrial plant	Corn	<i>Zea mays</i>	Seedling	Seed emergence		14 day	14 day	shoot height	NOEL	0.024	lb/acre	Springborn Laboratory Inc., MA	MRID 44307452	1996	M. Davy	2000	Yes	Yes	USEPA 2003
Distinct	50/20	terrestrial plant	Oat	<i>Avena sativa</i>	Seedling	Seed emergence			14 day	shoot height	NOEL	0.046	lb/acre	Springborn Laboratory Inc., MA	MRID 44307452	1996	M. Davy	2000	Yes	Yes	USEPA 2003
Distinct	50/20	terrestrial plant	Onion	<i>Allium cepa</i>	Seedling	Seed emergence			14 day	shoot height	NOEL	0.046	lb/acre	Springborn Laboratory Inc., MA	MRID 44307452	1996	M. Davy	2000	Yes	Yes	USEPA 2003
Distinct	49/20.4	bird	Bobwhite quail	<i>Colinus virginianus</i>	10 day	dietary	Diet	8 D	8 D	mortality	LC₅₀	> 6,080	ppm	Wildlife International	45040202	2001	M. Mahoney	2002	Yes	Yes	USEPA 2003
Distinct	49/20.4	terrestrial plant	Tomato	<i>Lycopersicon esculentum</i>	Juvenile plant	Vegetative vigor		21 day	21 day	shoot weight	EC ₂₅	0.01	lb/acre	ABC	45047301	2000	M. Mahoney	2002	Yes	Yes	USEPA 2003
Distinct	49/20.4	terrestrial plant	Ryegrass	<i>Lolium perenne</i>	Juvenile plant	Vegetative vigor		21 day	21 day	shoot weight	EC ₂₅	0.37	lb/acre	ABC	45047301	2000	M. Mahoney	2002	Yes	Yes	USEPA 2003
Distinct	49/20.4	bird	Bobwhite quail	<i>Colinus virginianus</i>	10 day	dietary	Diet	8 D	8 D	mortality	NOEL	6,080	ppm	Wildlife International	45040202	Yes	M. Mahoney	2002	Yes	Yes	USEPA 2003
Distinct	49/20.4	terrestrial plant	Tomato	<i>Lycopersicon esculentum</i>	Juvenile plant	Vegetative vigor		21 day	21 day	shoot weight	NOEL	0.004	lb/acre	ABC	45047301	Yes	M. Mahoney	2002	Yes	Yes	USEPA 2003
Distinct	49/20.4	terrestrial plant	Ryegrass	<i>Lolium perenne</i>	Juvenile plant	Vegetative vigor		21 day	21 day	shoot weight	NOEL	0.24	lb/acre	ABC	45047301	Yes	M. Mahoney	2002	Yes	Yes	USEPA 2003

Boldface indicates study selected for derivation of toxicity reference value (TRV) used in risk assessment.

¹Distinct and Overdrive contain the same ratio of active ingredients (approximately 21% diflufenzopyr and 55% dicamba)

²Toxicity values relate the dose of a compound with a potentially adverse effect. Values are reported as they were presented in the reviewed source.

³See the bibliography of this ERA document, Appendix A.1 of the associated Literature Review document, and source footnote for complete citations.

⁴Bluegreen algae were not used to derive toxicity reference values for the risk assessment.

⁵% purity ai expressed as the ratio of Dicamba/Diflufenzopyr.

Abbreviations
m - male
f - female
a.i. - active ingredient
NR - Not reported
MRID - Master Record Identification Number

Durations
hr - hours
d - days
w - weeks
m - months
y - years

Endpoints

EC₂₅ - 25% effect concentration
EC₅₀ - 50% effect concentration
IC₀ - concentration causing 0% inhibition of a process
IC₁₀₀ - concentration causing 100% inhibition of a process
IC₂₅ - concentration causing 25% inhibition of a process
IC₅₀ - concentration causing 50% inhibition of a process
LC₁₆ - lethal concentration, 16% mortality
LC₅₀ - median lethal concentration, 50% mortality
LC₇₀ - lethal concentration, 70% mortality
LC₉₅ - lethal concentration, 95% mortality
LD₅₀ - median lethal dose, 50% mortality
LOAEC - lowest-observable-adverse effect concentration
LOAEL - lowest-observable-adverse effect level
LOEC - lowest-observable-effect concentration
LOEL - lowest-observable-effect level
MATC - maximum acceptable toxicant concentration
NOAEC - no-observable-adverse effect concentration
NOAEL - no-observable-adverse effect level
NOEC - no-observable-effect concentration
NOEL - no-observable-effect level