U.S. Department of Agriculture (USDA) Forest Service (FS) Human Health and Ecological Risk Assessment (HHERA)



Sethoxydim (Poast®) Report Addendum

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1. Executive Summary

This document serves as an Addendum to the Human Health and Ecological Risk Assessment (HHERA) for the herbicide sethoxydim (and its formulated product Poast[®]), which was conducted for the United States Department of Agriculture (USDA) Forest Service (FS) in 2001 (USDA/FS 2001; referred to in this report as the 2001 HHERA). After a thorough review of current uses of sethoxydim by the FS and toxicological studies conducted since publication of the 2001 HHERA, human health and ecological risks were re-evaluated using the FS risk assessment worksheets (i.e., WorkSheetMaker Version 6.02.20). The 2001 HHERA and this Addendum follow the general approach of previous FS national HHERAs and FS risk assessment guidance, as posted on the FS Pesticide Management and Coordination website.

The quantitative risk characterization summarized in this HHERA Addendum is based on the hazard quotient (HQ), which is defined as the anticipated exposure (milligrams active ingredient per kilogram per day [mg a.i./kg/day] or milligrams active ingredient per liter [mg a.i./L]) divided by a non-carcinogenic toxicity value (mg a.i./kg/day or mg a.i./L) that is not likely to be associated with adverse effects. Note that sethoxydim is not considered a carcinogen (United States Environmental Protection Agency [USEPA] 2006). An HQ >1 is defined as the level of concern, such that HQs \leq 1 indicate that adverse effects are not likely to occur. HQs >1 and <2 represent a minimal risk, and HQs \geq 2 represent a more serious risk. The level of concern increases with increasing HQ values exceeding 1.

Since publication of the 2001 HHERA, the recommended maximum application rate for sethoxydim increased from 0.375 to 0.49 pounds of active ingredient per acre (lb a.i./acre). In addition, newly available toxicity studies resulted in changes to the toxicity values used to assess risks for some species, as shown in Table 1. Using the higher application rate and new toxicity values, this Addendum reassessed risks to human health (workers and the general public); terrestrial receptors (mammals, birds, insects, and non-target plants); and aquatic receptors (fish, aquatic invertebrates, aquatic macrophytes, and algae). As discussed in this Addendum, the increase in application rate had no-to-minimal effects on risk characterizations. However, changes in toxicity values used to assess risks resulted in higher risks for certain exposure scenarios and species.

In addition to the updated toxicity information, it should be noted that the WorkSheetMaker tool's exposure inputs and methodology have been revised over time. For example, the exposed skin surface area for the worker in the 2001 version was assumed to be 840 square centimeters (cm²) (hands only), whereas WorkSheetMaker Version 6.02.20 (current version) revises the skin surface area from hands to 1,070 cm². The basis of these revisions is primarily the incorporation of USEPA exposure factors as they were developed and published.

Variable	2001 HHERA	2024 Addendum
Application rate	0.375 lb a.i./acre	0.49 lb a.i./acre
Terrestrial plants, sensitive, drift	NOAEL: 0.006 lb a.i./acre	NOAEL: 0.003 lb a.i./acre
Terrestrial plants, sensitive, pre- emergence	NOAEL: 0.059 lb a.i./acre	NOAEL: 0.0073 lb a.i./acre
Terrestrial plants, tolerant, drift	NOAEL: 0.03 lb a.i./acre	NOAEL: 2.4 lb a.i./acre
Terrestrial plants, tolerant, pre- emergence	NOAEL: 0.235 lb a.i./acre	NOAEL: 1.9 lb a.i./acre
Fish, acute, sensitive	NOAEC: 1.2 mg a.i./L	NOAEC: 0.41 mg a.i./L

Table 1. Revised Risk Assessment Inputs

Variable	2001 HHERA	2024 Addendum
Fish, chronic, sensitive	NOAEC: 1.2 mg a.i./L (acute value)	NOAEC: 0.23 mg a.i./L
Fish, chronic, tolerant	NOAEC: 1.2 mg a.i./L (acute value)	NOAEC: 0.23 mg a.i./L
Aquatic invertebrates, acute, tolerant	NOAEC: 2.6 mg a.i./L	NOAEC: 78.1 mg a.i./L
Aquatic macrophytes, sensitive	NOAEC: 0.25 mg a.i./L	NOAEC: 0.0356 mg a.i./L

Abbreviations: a.i. = active ingredient; HHERA = Human Health and Ecological Risk Assessment; L = liter; NOAEC = no-observed-adverse-effect concentration; NOAEL = no-observed-adverse-effect level

Human Health Assessment: Human health HQs were calculated for workers and the general public. No toxicity input values for human health were revised; therefore, all increases in HQs for workers and the general public are due to the increased application rate and some updated exposure assumptions/parameters. For nearly all exposure scenarios, HQ increases were minimal, and the increased application rate did not result in a qualitative increase in risks. The only substantial change in the human health risk assessment is for water consumption by a child after an accidental spill. For this scenario, the upper-bound HQ increased from 1.3 to 2, indicating an increased risk for this exposure scenario.

Ecological Assessment for Terrestrial Species: The risk assessment for terrestrial species was updated for mammals, birds, terrestrial insects (including honeybees), and non-target terrestrial plants. The updated risk calculations for mammals resulted in small increases in HQs (<1-1.9) due to the increased application rate but did not result in substantial qualitative changes in risks to mammalian species. Increased risks to birds, with upper-bound HQs of 2-4, were observed for chronic exposure to contaminated broadleaf foliage and short grass. For terrestrial insects (not honeybees), the highest HQ was 2. For plants, the toxicity input values decreased two- to eight-fold for sensitive plants and increased by 28- to 40-fold for tolerant plants (Table 1). As a result, HQs for sensitive plants substantially increased, and HQs for tolerant plants decreased. For sensitive plants, HQs for direct spray and drift exposure increased from indicating no-to-minimal risks (HQs: <1-1.2) in the 2001 HHERA to serious risks (HQs: <1-163) in this updated assessment. Risks to plants for runoff (HQs: <1-4) and irrigation (HQs: <1-11) scenarios also increased. Because sethoxydim is an herbicide, serious risks to sensitive plants are expected. For tolerant species, all revised values resulted in lower HQs compared to the 2001 HHERA.

Ecological Assessment for Aquatic Species: For aquatic species, risks were assessed for fish, aquatic invertebrates, aquatic macrophytes, and algae. Toxicity input values were decreased for sensitive fish for acute and chronic exposures, tolerant fish for chronic exposure, and sensitive aquatic macrophytes. Toxicity input values were increased for tolerant invertebrates. In the 2001 HHERA, no risks were identified for any aquatic species for any exposure scenario, with all HQs <1. The updated risk calculations show increased risks for the accidental acute exposure scenario for sensitive and tolerant fish, sensitive aquatic invertebrates, sensitive and tolerant aquatic macrophytes, and sensitive and tolerant algae. For non-accidental acute exposure or chronic/longer term exposure, the only change in risk characterization was for acute exposure of aquatic macrophytes (sensitive species), with an upper-bound HQ of 2.

Conclusions: The 2024 risk characterization based on an increased application rate, updated toxicity values, and human health exposure assumptions resulted in several changes to risk characterizations compared to the 2001 HHERA. Note that in the 2001 HHERA, nearly all HQs were <1. For the following exposure scenarios and receptors, upper-bound HQs were \geq 2:

• Human health: Child, acute exposure through consumption of water contaminated from a spill.

- Terrestrial receptors:
 - Birds, chronic exposure to contaminated broadleaf foliage.
 - Birds, chronic exposure to contaminated short grass.
 - Terrestrial insects (not honeybees), acute exposure to short grass.
 - Plants (sensitive species), exposed to direct spray and spray drift.
 - Plants (sensitive species), exposed to runoff.
 - Plants (sensitive species) exposed to contaminated irrigation water.
- Aquatic receptors:
 - o Fish, sensitive and tolerant, acute exposure from an accidental spill.
 - Aquatic invertebrates, sensitive, acute exposure from an accidental spill.
 - Aquatic macrophytes, sensitive and tolerant, acute exposure from an accidental spill.
 - \circ Aquatic macrophytes, sensitive, acute non-accidental exposure.
 - o Algae, sensitive and tolerant, acute exposure from an accidental spill.

2. Introduction

The USDA FS is responsible for managing National Forest System Land to provide a mix of goods and services to the public, including access to national forests; livestock grazing; timber management; visual quality; water quality; and vegetation, wildlife, and fish diversity. Each Forest Land and Resource Management Plan details specific resource management objectives and output goals, which may require the implementation of integrated pest and vegetation management programs when using pesticides. To comply with the National Environmental Policy Act (NEPA) of 1969 as amended (40 CFR 1500-1508), the FS evaluates the risks to humans, wildlife, other non-target organisms, and the environment due to current or future pest or vegetation management programs. Since the 1980s, the FS has supported the development and deployment of HHERAs of chemicals proposed for use by the FS. Prior to the use of any pesticides on forest lands, a HHERA must be prepared to evaluate potential human health and ecological effects.

The FS uses sethoxydim, an herbicide, in vegetation management programs. The most recent HHERA for sethoxydim was published in 2001 (USDA/FS 2001). Since that publication, the FS has revised its use of sethoxydim, specifically using a higher application rate. In addition, more recent toxicity studies applicable to human and ecological targets were available.

This Addendum updates the risk assessments for human health and ecological effects of the use of the sethoxydim formulation Poast in FS programs using new application rate and toxicity information; however, much of the information presented in the 2001 HHERA still applies and is referenced herein.

3. Chemical Information

3.1. Chemical Description and Commercial Formulations

Sethoxydim is the common name for 2-(1-(ethoxyimino)butyl)-5-(2-(ethylthio)propyl)-3-hydroxy-2-cyclohexen-1-one. Several commercial formulations of sethoxydim are available. Labels received from the FS in the evaluation for this Addendum include Poast (18% sethoxydim), Vantage[®] (13% sethoxydim), and NuFarm[®] (13% sethoxydim). Only one commercial formulation of sethoxydim, Poast, is used in FS programs. This formulation is produced by BASF Corporation and contains sethoxydim as the only a.i. (see Attachment 1). Poast is a liquid formulation containing sethoxydim (18%) at a concentration of 1.5 lbs. per gallon and inerts (82%). Poast is recommended as a selective post-emergence herbicide for the control of annual or perennial grass weeds in select crops and other labeled site uses. Attachments 3 and 4 summarize the physical and chemical properties that were used in WorkSheetMaker for modeling the fate and transport of sethoxydim.

3.2. Evaluation of Other Ingredients

Poast contains a high percentage (74%) of petroleum solvent, which includes naphthalene (7% of the petroleum solvents). There is extensive literature on the toxicity of naphthalene and petroleum solvents; however, a detailed review of this literature is beyond the scope of the assessment described in this Addendum.

The 2001 HHERA (USDA/FS 2001) identifies the neurological system as the most sensitive target for naphthalene and petroleum solvents, including central nervous system (CNS) depression and other signs of neurotoxicity. Results of the toxicity studies reviewed in this Addendum do not change conclusions of the 2001 HHERA regarding the potential contributing role of naphthalene and petroleum solids. As described in the HHERA (USDA/FS 2001):

- The primary effect of naphthalene and petroleum solvents involves CNS depression and other signs of neurotoxicity that are similar to the effects seen in animals exposed to Poast, as well as sethoxydim.
- For oral and dermal exposures, the quantitative significance of the petroleum in Poast does not appear to be substantial. The toxicity of Poast and sethoxydim appear to be comparable after oral and dermal exposures.
- For inhalation exposures, there is some evidence that Poast may be more toxic and cause qualitatively different toxic effects consistent with the presence of petroleum solvent.
- There is ample evidence that Poast is much more toxic to aquatic species than sethoxydim, suggestive of the role of the petroleum solvent in Poast.

A recent review of naphthalene conducted by the Agency for Toxic Substances and Disease Registry (ATSDR) indicates that neurological toxicity is the most sensitive effect following oral exposure of laboratory animals (ATSDR 2024). Other less sensitive adverse effects of oral exposure include damage to the lungs, liver, and immune system. For inhalation exposure, studies in laboratory animals identify the respiratory tract and immune system as the most sensitive targets. At higher inhalation exposures, more severe respiratory damage was observed.

3.3. Application Methods

Sethoxydim may be applied by directed foliar, broadcast foliar, or aerial methods; however, the aerial application method is not used in FS programs and was not modeled in either the 2001 HHERA or this Addendum. The directed foliar and broadcast foliar methods were evaluated in 2001 and were re-evaluated for this Addendum. The broadcast foliar application method is the most common method of application for sethoxydim in FS programs. With booms mounted on a tractor or other

heavy-duty vehicle, workers will typically treat 11 to 21 acres/hour. In selective foliar applications, the herbicide sprayer or container is carried by backpack, and the herbicide is applied to selected target vegetation. Application crews may treat up to shoulder-high brush, which means that chemical contact with the arms, hands, or face is plausible. To reduce the likelihood of significant exposure, application crews are directed not to walk through treated vegetation. Usually, a worker treats approximately 0.5 acre/hour, with a plausible range of 0.25 to 1 acre/hour.

3.4. Application Rates

The labeled application rates for Poast range from 0.09375 lb a.i./acre to 0.49 lb a.i./acre (see Attachment 1). The upper application rate was increased from 0.375 lb a.i./acre (used in the 2001 HHERA) to 0.49 lb a.i./acre (used in this Addendum) because the product label for Poast defines an application rate of 0.49 lb a.i./acre for grasses that may be treated by the FS (e.g., Bermuda grass, Johnsongrass, and Torpedograss). For this Addendum, the lower and mid limits of the application rate were not altered from the 2001 HHERA and are 0.09375 lb/acre to 0.3 lb/acre, respectively, though this Addendum only presents risk results calculated using the maximum application rate of 0.49 lb a.i./acre. The ground application volumes of 5, 10, and 20 gallons of water per acre are unchanged from the 2001 HHERA. However, due to the increased application rate, the concentrations in field solution used in this Addendum are 2.9, 5.9, and 12 mg a.i./mL, respectively. These are slightly higher than concentrations in the field solutions used in the 2001 HHERA (0.56, 3.6, and 9 mg a.i./mL, respectively).

3.5. Use Statistics

Poast, as well as many of the other commercial formulations of sethoxydim, is used in agriculture; however, overall use has declined from 1992 to 2018, as shown in Figure 1 (United States Geological Survey [USGS] 2018). In 2018, an estimated 0.25 million pounds of sethoxydim was used on vegetable and fruit crops. As indicated by the map (Figure 1 cont.), sethoxydim is used primarily in the upper Midwest and Eastern portions of the United States. By comparison, less than 100 lbs a.i. were used by the FS from 2019 to 2023, primarily in Regions 5, 6, and 9 (the Pacific Southwest, the Pacific Northwest, and the Eastern FS Regions, respectively).





Figure 1 cont. U.S. Geological Survey EPest-High Agricultural Use Estimates for Sethoxydim in 2018



4. HHERA Update

This HHERA update involves review of toxicological information available since the 2001 HHERA and recalculation of HQs using the FS WorkSheetMaker risk assessment tool. According to the USEPA Office of Pesticide Programs (OPP), sethoxydim is in the process of being reregistered under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). The Reregistration Eligibility Decision (RED) was published in 2005 (USEPA/OPP 2005), and various HHERAs and toxicological information are available in the USEPA public dockets at https://www.regulations.gov.

4.1. Literature Search

An FS-contracted information scientist conducted literature searches for sethoxydim in January 2024 to identify toxicity information on sethoxydim published since the previous HHERA was conducted in 2001. The PubMed database was searched, as well as the following databases via EBSCOhost: AGRICOLA, Biological Abstracts, CAB Abstracts, Environment Complete, and Global Health. Searches were date-limited from the year 2000 forward. The search terms consisted of the Chemical Abstracts Service (CAS) Registry number, 74051-80-2; the chemical names sethoxydim and Poast; and other synonyms identified using the Comptox Chemicals Dashboard, Common Chemistry, and other sources. The literature search results were stored and deduplicated in an Endnote library. Database query strings are provided in Attachment 2.

The National Pesticide Information Retrieval System (NPIRS) was searched by CAS Registry number from 2000 to January 2024 to obtain master record identifier (MRID) numbers and references of studies that have been submitted to the USEPA, largely in support of product registrations. Eighty-four MRID submissions were identified; 24 of these were requested from USEPA. Data Evaluation Records (DERs; USEPA-produced reviews of individual submitted studies) for 13 of these MRIDs were obtained from USEPA. Other sources of grey literature (i.e., information produced by organizations outside of traditional commercial or academic publishing) were searched using the terms sethoxydim, Poast, and 74051-80-2. Results from the grey literature searches were screened, and selected references were added to the Endnote library. The additional grey literature sources searched are listed in Attachment 2.

4.2. Human Health Risk Assessment

The four steps in a human health risk assessment are hazard identification, exposure assessment, dose-response assessment, and risk characterization. The hazard identification process involves the examination of available scientific data, such as mechanisms of action, toxicokinetics, and toxicity, to determine the potential adverse health effects associated with exposure to a chemical. For sethoxydim (Poast), no changes were made to the hazard identification from the 2001 HHERA, although some toxicity values have been revised based on new information (see Section 4.2.2). The exposure assessment, dose-response assessment, and risk characterization are discussed in the following sections.

4.2.1. Exposure Assessment

Exposure assessment is a process in risk assessment that identifies potential receptors of contamination or chemical releases, exposure routes, and exposure point concentrations for environmental media to which a receptor may be exposed.

Calculations of exposure in this Addendum are based on the maximum application rate of 0.49 lb a.i./acre, which is higher than the maximum application rate used in the 2001 HHERA (0.375 lb a.i./acre). The application rate, along with the concentration of sethoxydim in field solutions (see Section 3.4), is used to determine the exposure point concentration used in the risk calculations. For

exposure scenarios involving bodies of water (e.g., spills followed by water or fish consumption), the USDA Groundwater Loading Effects of Agricultural Management Systems (GLEAMS) model is used to model concentrations of sethoxydim in surface water (see Attachment 3).

In the 2001 HHERA and in this Addendum, exposure scenarios are presented for both workers and members of the general public. Two types of exposure scenarios are taken into consideration: general exposures resulting from the normal handling and application of the compound and accidental/incidental exposures involving specific events that might occur during application. Exposures were assessed using Excel workbooks generated through WorkSheetMaker and included as Attachment 4. These worksheets detail the exposure scenarios assessed (e.g., direct spray of child, accidental spill on hand, etc.) and the exposure parameters used (e.g., body weight, skin surface area, etc.).

4.2.2. Dose-Response Assessment

Toxicity values used in the updated human health risk calculations are shown in Table 2; the test material for these studies was technical sethoxydim (approximately 94-99% a.i.). The acute and chronic reference doses (RfDs) for sethoxydim used in the 2001 HHERA are also used in this Addendum. The acute RfD of 0.6 mg a.i./kg body weight is based on a no-observed-adverse-effect-level (NOAEL) in rabbits of 180 mg a.i./kg/day and a total uncertainty factor (UF) of 300 (10 for extrapolating from animals to humans, 10 for extrapolating to sensitive individuals within the human population, and a Food Quality Protection Act [FQPA] UF of 3 for the possible increased sensitivity of children to sethoxydim) (USEPA/OPP 1998). In the 2005 RED (USEPA/OPP 2005), an acute RfD of 1.8 mg a.i./kg body weight was determined based on a rat developmental study with a NOAEL of 180 mg a.i./kg/day; however, this derivation used an FQPA UF of 1 instead of 3. For this Addendum, the FQPA UF of 3 has been conservatively retained, and the lower acute RfD of 0.6 mg a.i./kg body weight is used.

Receptor	Duration	Endpoint	Previous Value	Updated Value	Source
Worker	Acute	RfD	0.6 mg a.i./kg bw	Unchanged	USEPA/OPP 1998
Worker	Chronic	RfD	0.09 mg a.i./kg/day	Unchanged	International Research and Development Corporation (IRDC) 1984
General Public	Acute	RfD	0.6 mg a.i./kg bw	Unchanged	USEPA/OPP 1998
General Public	Chronic	RfD	0.09 mg a.i./kg/day	Unchanged	IRDC 1984

Table 2. Human Health Toxicity Values Used in the Updated Sethoxydim HHERA Addendum

Note: Test material was technical sethoxydim (~94-99% a.i.).

Abbreviations: a.i. = active ingredient; bw = body weight; HHERA = Human Health and Ecological Risk Assessment; kg = kilogram; mg = milligram; RfD = reference dose

The chronic RfD of 0.09 mg a.i./kg/day used in the 2001 HHERA is based on a NOAEL of 9 mg a.i./kg/day for a one-year feed study in dogs (IRDC 1984) and a total UF of 100 (10 for extrapolating from animals to humans and 10 for extrapolating to sensitive individuals within the human population). In the 2005 RED (USEPA/OPP 2005), a chronic RfD of 0.14 mg a.i./kg/day was derived from a chronic toxicity/carcinogenicity study in mice with a NOAEL of 14 mg a.i./kg/day. The lower chronic RfD (0.09 mg a.i./kg/day) was retained in this Addendum as a conservative measure.

4.2.3. Risk Characterization

The HQs for exposure of workers and the general public to sethoxydim are shown in Tables 3-6 for the two application methods evaluated: backpack directed and ground broadcast foliar. HQs from the 2001 HHERA are shown for comparison. All HQs are either unchanged from 2001 or slightly higher due to the increased application rate. For workers, all HQs are <1 (Table 3). For the general public, HQs >1 are estimated for acute accidental exposures of children (from water consumption after a spill) (Table 4). Nonaccidental acute exposures of the general public result in HQs <1 for all exposure scenarios except consumption of contaminated vegetation by an adult female (upperbound HQs of 1.1; Table 5). No HQs for exposures of the general public on a chronic/long-term basis exceed 1 (Table 6).

Table 3a. Hazard Quotients (HQs)¹ for General and Accidental Exposures of Workers – Backpack Directed Foliar

Exposure Scenario	2001 ²	2024
General exposure (chronic)	<1	<1
Accidental/incidental exposure (acute): Glove, 1 minute	<1	<1
Accidental/incidental exposure (acute): Glove, 1 hour	<1	<1
Accidental/incidental exposure (acute): Spill on hands, 1 hour	<1	<1
Accidental/incidental exposure (acute): Spill on lower legs, 1 hour	<1	<1

Table 3b. Hazard Quotients (HQs)¹ for General and Accidental Exposures of Workers – Ground Broadcast Foliar

Exposure Scenario	2001 ²	2024
General exposure (chronic)	<1	<1
Accidental/incidental exposure (acute): Glove, 1 minute	<1	<1
Accidental/incidental exposure (acute): Glove, 1 hour	<1	<1
Accidental/incidental exposure (acute): Spill on hands, 1 hour	<1	<1
Accidental/incidental exposure (acute): Spill on lower legs, 1 hour	<1	<1

¹HQ ranges are for lower- to upper-bound exposure estimates. HQs listed as <1 or \leq 1 (with no range) indicate that HQs for lower, central, and upper estimates are all \leq 1.

²Acute HQs in the 2001 HHERA were not reported by application method.

Abbreviations: HHERA = Human Health and Ecological Risk Assessment

Key: Cells are colored for the highest HQ:

HQ≤1 HQ>1-<2 HQ≥2

Table 4a. Hazard Quotients (HQs)¹ for Acute Accidental Exposures of the General Public – Backpack Directed Foliar

Exposure Scenario	2001 ²	2024
Direct spray of child, whole body	<1	<1
Direct spray of adult female, feet and lower legs	<1	<1
Water consumption (spill), child	<1-1.3	<1-2
Fish consumption (spill), adult male	<1	<1
Fish consumption (spill), subsistence population	<1	<1

Table 4b. Hazard Quotients (HQs)¹ for Acute Accidental Exposures of the General Public – Ground **Broadcast Foliar**

Exposure Scenario	2001 ²	2024
Direct spray of child, whole body	<1	<1
Direct spray of adult female, feet and lower legs	<1	<1
Water consumption (spill), child	<1-1.3	<1-2
Fish consumption (spill), adult male	<1	<1
Fish consumption (spill), subsistence population	<1	<1

¹HQ ranges are for lower to upper-bound exposure estimates. HQs listed as <1 or ≤ 1 (with no range) indicate that HQs for lower, central, and upper estimates are all ≤ 1 .

²HQs in the 2001 HHERA were not reported by application method.

Abbreviations: HHERA = Human Health and Ecological Risk Assessment

Key: Cells are colored for the highest HQ: HQ ≤ 1 HQ>1-<2 HQ ≥ 2



Table 5a. Hazard Quotients (HQs)¹ for Nonaccidental Acute Exposures of the General Public – **Backpack Directed Foliar**

Exposure Scenario	2001 ²	2024
Dermal contact with vegetation, shorts and t-shirt, adult female	<1	<1
Ingestion of contaminated fruit, adult female	<1	<1
Ingestion of contaminated vegetation, adult female	<1	<1-1.1
Swimming, 1 hour, adult female	NA	<1
Water consumption, child	<1	<1
Fish consumption, adult male	<1	<1
Fish consumption, subsistence population	<1	<1

Table 5b. Hazard Quotients (HQs)¹ for Nonaccidental Acute Exposures of the General Public – **Ground Broadcast Foliar**

Exposure Scenario	2001 ²	2024
Dermal contact with vegetation, shorts and t-shirt, adult female	<1	<1
Ingestion of contaminated fruit, adult female	<1	<1
Ingestion of contaminated vegetation, adult female	<1	<1-1.1
Swimming, 1 hour, adult female	NA	<1
Water consumption, child	<1	<1
Fish consumption, adult male	<1	<1
Fish consumption, subsistence population	<1	<1

¹HQ ranges are for lower to upper-bound exposure estimates. HQs listed as <1 or \leq 1 (with no range) indicate that HQs for lower, central, and upper estimates are all ≤ 1 .

²HQs in the 2001 HHERA were not reported by application method.

Abbreviations: HHERA = Human Health and Ecological Risk Assessment; NA = not assessed

Key: Cells are colored for the highest HQ:

HQ≤1 HQ>1-<2 HQ≥2

Table 6a. Hazard Quotients (HQs)¹ for Chronic/Longer Term Exposures of the General Public – Backpack Directed Foliar

Exposure Scenario	2001 ²	2024
Ingestion of contaminated fruit, adult female	<1	<1
Ingestion of contaminated vegetation, adult female	NA	<1
Water consumption, adult male	<1	<1
Fish consumption, adult male	<1	<1

Table 6b. Hazard Quotients (HQs)¹ for Chronic/Longer Term Exposures of the General Public – Ground Broadcast Foliar

Exposure Scenario	2001 ²	2024
Ingestion of contaminated fruit, adult female	<1	<1
Ingestion of contaminated vegetation, adult female	NA	<1
Water consumption, adult male	<1	<1
Fish consumption, adult male	<1	<1
Fish consumption, subsistence population	<1	<1

¹HQ ranges are for lower to upper-bound exposure estimates. HQs listed as <1 or \leq 1 (with no range) indicate that HQs for lower, central, and upper estimates are all \leq 1.

²HQs in the 2001 HHERA were not reported by application method.

Abbreviations: HHERA = Human Health and Ecological Risk Assessment; NA = not assessed

Key: Cells are colored for the highest HQ:



HQ≤1 HQ>1-<2 HQ≥2</p>

4.3. Ecological Risk Assessment

Ecological risk assessment involves hazard identification, exposure assessment, dose-response assessment, and risk characterization. The hazard identification for ecological risk assessment describes the possible adverse effects associated with sethoxydim to ecological receptors through a review of the available toxicological literature. No changes were made to the hazard identification for sethoxydim from the 2001 HHERA other than revising toxicity values based on new information (see Section 4.3.2). The exposure assessment, dose-response assessment, and risk characterization are discussed below.

4.3.1. Exposure Assessment

A standard set of exposure assessments for terrestrial and aquatic organisms is provided in the Excel workbooks for sethoxydim (Attachment 4). The workbooks contain a set of worksheets that detail each exposure scenario. In FS risk assessments, the methodology and results of calculations are provided in the worksheets. For each exposure scenario, the worksheets provide the calculation of an exposure dose that is compared to dose-response values described in Section 4.3.2. These dose-response values are used to calculate HQs. Calculations of exposure are based on the maximum application rate, which has been updated to 0.49 lb a.i./acre from the 0.375 lb a.i./acre used in the 2001 HHERA.

As sethoxydim is an herbicide, all terrestrial and aquatic organisms aside from plants are considered "non-target." This HHERA Addendum, similar to the 2001 HHERA, evaluates potential effects on mammals, birds, terrestrial invertebrates (including honeybees), terrestrial plants, and aquatic organisms, including fish, aquatic invertebrates, aquatic macrophytes, and algae. As no toxicity data were identified for amphibians, that receptor was not evaluated in this Addendum. Details of exposure scenarios and exposure parameters evaluated are provided in Attachment 4.

4.3.2. Dose-Response Assessment

Toxicity values used in the updated ecological risk calculations are shown in Table 7, and summaries of toxicity studies reviewed for this Addendum are provided in Attachment 5. Studies were conducted using either technical sethoxydim (approximate purity of 94-99% a.i.) or formulated sethoxydim product (i.e., Poast; 18-19% a.i.). Cases where it was not clear whether the test material was technical sethoxydim or Poast are noted in the tables.

Receptor	Duration	Endpoint	Previous Value	Updated Value	Source
Mammals	Acute	NOAEL	180 mg a.i./kg bw ¹	Unchanged	USEPA/OPP 1998
Mammals	Chronic	NOAEL	9 mg a.i./kg bw/day ¹	Unchanged	IRDC 1984
Birds	Acute	NOAEL	500 mg a.i./kg bw¹	Unchanged	Bryceland et al. 1997
Birds	Chronic	NOAEL	10 mg a.i./kg bw/day¹	Unchanged	Beavers 1996
Honeybee	Oral	NOAEL	107 mg a.i./kg bw ¹	Unchanged	BASF 1982
Honeybee	Contact	NOAEL	107 mg a.i./kg bw ¹	Unchanged	BASF 1982
Terrestrial invertebrates	Acute	NOAEL	107 mg a.i./kg bw¹	Unchanged	BASF 1982
Terrestrial plants, sensitive	Drift	NOAEL	0.006 lb a.i./acre	0.003 lb a.i./acre ²	MRID 47691704
Terrestrial plants, sensitive	Pre- emergence	NOAEL	0.059 lb a.i./acre	0.0073 lb a.i./acre ²	MRID 50420002
Terrestrial plants, tolerant	Drift	NOAEL	0.03 lb a.i./acre	2.4 lb a.i./acre ²	MRID 50420003
Terrestrial plants, tolerant	Pre- emergence	NOAEL	0.235 lb a.i./acre	1.9 lb a.i./acre ²	MRID 50420002

Table 7a. Ecological Toxicity Values Used in the Updated Sethoxydim HHERA Addendum -	-
Terrestrial Receptors	

Table 7b. Ecological Toxicity Values Used in the Updated Sethoxydim HHERA Addendum – Aquatic Receptors

Receptor	Duration	Endpoint	Previous Value	Updated Value	Source
Fish, sensitive	Acute	NOAEC	1.2 mg a.i./L	0.41 mg a.i./L ²	MRID 47691701
Fish, sensitive	Chronic	NOAEC	NA	0.23 mg a.i./L ²	MRID 47691703
Fish, tolerant	Acute	NOAEC	1.2 mg a.i./L ²	Unchanged	Bryceland et al. 1997
Fish, tolerant	Chronic	NOAEC	NA	0.23 mg a.i./L ²	MRID 47691703
Aquatic invertebrates, sensitive	Acute	NOAEC	2.6 mg a.i./L ²	Unchanged	Bryceland et al. 1997

Receptor	Duration	Endpoint	Previous Value	Updated Value	Source
Aquatic invertebrates, tolerant	Acute	NOAEC	2.6 mg a.i./L	78.1 mg a.i./L ¹	MRID 00042816 as cited in USEPA/OPP 2019
Aquatic invertebrates	Chronic	NOAEC	NA	NA	NA
Aquatic plants (macrophytes), sensitive	-	NOAEC	0.25 mg a.i./L	0.0356 mg a.i./L ²	MRID 48000902
Aquatic plants (macrophytes), tolerant	-	NOAEC	0.25 mg a.i./L ^c	Unchanged	Bryceland et al. 1997
Aquatic plants (Algae), sensitive	-	NOAEC	0.25 mg a.i./L ¹	Unchanged	Bryceland et al. 1997; MRID 43626101 as cited in USEPA/OPP 2019
Aquatic plants (Algae), tolerant	-	NOAEC	0.25 mg a.i./L ¹	Unchanged	Bryceland et al. 1997; MRID 43626101 as cited in USEPA/OPP 2019
Amphibians and reptiles	Acute	NOAEC	NA	NA	NA
Amphibians and reptiles	Chronic	NOAEC	NA	NA	NA

¹Test material was technical sethoxydim (~94-99% a.i.).

²Test material was formulated product (Poast; ~19% a.i.).

³Test material uncertainty (likely Poast).

Abbreviations: a.i. = active ingredient; bw = body weight; L = liter; lb = pound; mg = milligram; NA = not available; NOAEC = no-observed-adverse-effect concentration; NOAEL = no-observed-adverse-effect level

For assessments of terrestrial targets, acute and chronic NOAELs for mammals, birds, and terrestrial invertebrates (including honeybees) used in the 2001 HHERA are also used in this Addendum. For these receptors, newer toxicity information either was not available or reported higher (less conservative) NOAELs, or studies were not as scientifically rigorous as previous studies. For tolerant and sensitive terrestrial plants, NOAELs were updated based on three studies summarized in DERs by USEPA and shown in Attachment 5 of this Addendum (MRID 47691704, MRID 50420002, and MRID 50420003).

For assessment of aquatic receptors, the acute no-observed-adverse-effect concentration (NOAEC) for sensitive fish was revised based on data provided in the DER for MRID 47691701; the acute NOAEC for tolerant fish used in the 2001 HHERA was also used in this Addendum. The acute NOAEC for sensitive aquatic invertebrates used in the 2001 HHERA was also used in this Addendum, but the acute NOAEC for tolerant aquatic invertebrate species was updated based on MRID 00042816 as cited in USEPA/OPP (2019). Chronic NOAECs were not available for fish or aquatic invertebrates in the 2001 HHERA; instead, acute NOAECs were used as surrogates to allow evaluation of chronic scenarios. However, use of acute data to approximate chronic risks is not considered appropriate, as chronic toxicity NOAECs are typically lower than acute toxicity NOAECs, resulting in an underestimate of risk. For chronic exposure to fish, more recent studies have been published (see Attachment 5), filling this data gap. The chronic NOAECs for sensitive and tolerant fish were based

on MRID 47691703. No chronic NOAECs are available for aquatic invertebrates; therefore, no assessment was conducted for chronic exposure of aquatic invertebrates. For sensitive and tolerant aquatic plants (macrophytes and algae), NOAECs used in the 2001 HHERA were used in this Addendum, except for sensitive aquatic macrophytes, which used a NOAEC derived from data in MRID 48000902. Amphibians and reptiles were not evaluated in the 2001 HHERA or in this Addendum due to a lack of toxicity information.

4.3.3. Risk Characterization

The HQs for exposure of ecological receptors to sethoxydim are shown in Tables 8 through 13 for the two application methods evaluated: backpack directed and ground broadcast foliar. HQs from the 2001 HHERA are shown for comparison.

4.3.3.1. Mammals

The risk characterization for mammals uses the acute and chronic NOAELs for technical sethoxydim from the 2001 HHERA. As a result, any changes in risk between the 2001 HHERA and this Addendum are due to the higher application rate incorporated in the models. As shown in Tables 8 and 9, all HQ ranges (lower- to upper-bound) are either unchanged from the previous HHERA (i.e., <1) or slightly above 1. The exposure pathways resulting in HQs >1 are acute and chronic exposure of mammals to contaminated short grass (with upper-bound HQs of 1.9 and 1.8, respectively) and acute exposure to contaminated broadleaf foliage (upper-bound HQ of 1.1). For mammals, no quantitative or qualitative changes in risk were observed using the higher application rate in this Addendum compared to the lower application rate in the 2001 HHERA (USDA/FS 2001).

Table 8a. Hazard Quotients (HQs)¹ for Accidental Acute Exposures of Mammals to Sethoxydim – Backpack Directed Foliar

Exposure Scenario	2001 ²	2024
Direct spray (100% absorption)	<1	<1
Consumption of contaminated water	<1	<1
Consumption of contaminated fish	NA	<1

Table 8b. Hazard Quotients (HQs)¹ for Accidental Acute Exposures of Mammals to Sethoxydim – Ground Broadcast Foliar

Exposure Scenario	2001 ²	2024
Direct spray (100% absorption)	<1	<1
Consumption of contaminated water	<1	<1
Consumption of contaminated fish	NA	<1

¹HQ ranges are for lower to upper-bound exposure estimates. HQs listed as <1 or ≤ 1 (with no range) indicate that HQs for lower, central, and upper estimates are all ≤ 1 .

²HQs in the 2001 HHERA were not reported by application method.

Abbreviations: HHERA = Human Health and Ecological Risk Assessment; NA = not assessed

Key: Cells are colored for the highest HQ:

HQ≤1 HQ>1-<2 HQ≥2

Table 9a. Hazard Quotients (HQs) ¹ for Non-Accidental Acute and Chronic/Longer Term Exposures
of Mammals to Sethoxydim – Backpack Directed Foliar

Exposure Scenario	2001 ²	2024
Acute exposure: Contaminated fruit	<1	<1
Acute exposure: Contaminated broadleaf foliage	<1	<1-1.1
Acute exposure: Contaminated tall grass	<1	<1
Acute exposure: Contaminated short grass	<1	<1-1.9
Acute exposure: Contaminated insects	NA	<1
Acute exposure: Contaminated water	<1	<1
Acute exposure: Contaminated fish	NA	<1
Acute exposure: Contaminated small mammal (after direct spray)	NA	<1
Chronic/longer term exposure: Contaminated fruit	<1	<1
Chronic/longer term exposure: Contaminated broadleaf foliage	<1	≤1
Chronic/longer term exposure: Contaminated tall grass	<1	<1
Chronic/longer term exposure: Contaminated short grass	<1	<1-1.8
Chronic/longer term exposure: Contaminated water	<1	<1
Chronic/longer term exposure: Contaminated fish	NA	<1

Table 9b. Hazard Quotients (HQs)¹ for Non-Accidental Acute and Chronic/Longer Term Exposures of Mammals to Sethoxydim – Ground Broadcast Foliar

Exposure Scenario	2001 ²	2024
Acute exposure: Contaminated fruit	<1	<1
Acute exposure: Contaminated broadleaf foliage	<1	<1-1.1
Acute exposure: Contaminated tall grass	<1	<1
Acute exposure: Contaminated short grass	<1	<1-1.9
Acute exposure: Contaminated insects	NA	<1
Acute exposure: Contaminated water	<1	<1
Acute exposure: Contaminated fish	NA	<1
Acute exposure: Contaminated small mammal (after direct spray)	NA	<1
Chronic/longer term exposure: Contaminated fruit	<1	<1
Chronic/longer term exposure: Contaminated broadleaf foliage	<1	≤1
Chronic/longer term exposure: Contaminated tall grass	<1	<1
Chronic/longer term exposure: Contaminated short grass	<1	<1-1.8
Chronic/longer term exposure: Contaminated water	<1	<1
Chronic/longer term exposure: Contaminated fish	NA	<1

¹HQ ranges are for lower- to upper-bound exposure estimates for small to large mammals. HQs listed as <1 or \leq 1 (with no range) indicate that HQs for lower, central, and upper estimates are all \leq 1.

²HQs in the 2001 HHERA were not reported by application method.

Abbreviations: HHERA = Human Health and Ecological Risk Assessment; NA = not assessed Key: Cells are colored for the highest HQ:

HQ≤1 HQ>1-<2 HQ≥2

4.3.3.2. Birds

The risk characterization for birds uses the acute and chronic NOAELs for technical sethoxydim from the 2001 HHERA and increases in HQs shown in Table 10 are due to the higher application rate used in this Addendum. The only acute exposure pathway with HQs exceeding 1 is non-accidental acute exposure to contaminated short grass (upper-bound HQ of 1.7). Chronic exposure to contaminated vegetation by birds (broadleaf foliage, tall grass, and short grass) results in higher HQs, with upper-bound HQs of 2, 1.8, and 4, respectively. For birds, slightly higher risks due to chronic exposure to sethoxydim were observed compared to those derived using the lower application rate in the 2001 HHERA.

Table 10a. Hazard Quotients (HQs) ¹ for Accidental and Non-Accidental Acute and Chronic/Longer
Term Exposures of Birds to Sethoxydim – Backpack Directed Foliar

Exposure Scenario	2001 ²	2024
Accidental acute exposure: Consumption of contaminated water	NA	<1
Accidental acute exposure: Consumption of contaminated fish	<1	<1
Non-accidental acute exposure: Contaminated fruit	<1	<1
Non-accidental acute exposure: Contaminated broadleaf foliage	<1	<1
Non-accidental acute exposure: Contaminated tall grass	<1	<1
Non-accidental acute exposure: Contaminated short grass	<1	<1-1.7
Non-accidental acute exposure: Contaminated water	NA	<1
Non-accidental acute exposure: Contaminated insects	<1	<1
Non-accidental acute exposure: Contaminated small mammal (after direct spray)	NA	<1
Non-accidental acute exposure: Contaminated fish	<1	<1
Chronic/longer term exposure: Contaminated fruit	<1	<1
Chronic/longer term exposure: Contaminated broadleaf foliage	<1	<1-2
Chronic/longer term exposure: Contaminated tall grass	<1	<1-1.8
Chronic/longer term exposure: Contaminated short grass	<1	<1-4
Chronic/longer term exposure: Contaminated water	NA	<1
Chronic/longer term exposure: Contaminated fish	<1	<1

 Table 10b. Hazard Quotients (HQs)¹ for Accidental and Non-Accidental Acute and Chronic/Longer

 Term Exposures of Birds to Sethoxydim – Ground Broadcast Foliar

Exposure Scenario	2001 ²	2024
Accidental acute exposure: Consumption of contaminated water	NA	<1
Accidental acute exposure: Consumption of contaminated fish	<1	<1
Non-accidental acute exposure: Contaminated fruit	<1	<1
Non-accidental acute exposure: Contaminated broadleaf foliage	<1	<1
Non-accidental acute exposure: Contaminated tall grass	<1	<1
Non-accidental acute exposure: Contaminated short grass	<1	<1-1.7
Non-accidental acute exposure: Contaminated water	NA	<1
Non-accidental acute exposure: Contaminated insects	<1	<1
Non-accidental acute exposure: Contaminated small mammal (after direct spray)	NA	<1
Non-accidental acute exposure: Contaminated fish	<1	<1

Exposure Scenario	2001 ²	2024
Chronic/longer term exposure: Contaminated fruit	<1	<1
Chronic/longer term exposure: Contaminated broadleaf foliage	<1	<1-2
Chronic/longer term exposure: Contaminated tall grass	<1	<1-1.8
Chronic/longer term exposure: Contaminated short grass	<1	<1-4
Chronic/longer term exposure: Contaminated water	NA	<1
Chronic/longer term exposure: Contaminated fish	<1	<1

¹HQs listed as <1 or \leq 1 (with no range) indicate that HQs for lower, central, and upper estimates are all \leq 1. ²HQs in the 2001 HHERA were not reported by application method.

Abbreviations: HHERA = Human Health and Ecological Risk Assessment; NA = not assessed Key: Cells are colored for the highest HQ:

HQ≤1 HQ>1-<2 HQ≥2

4.3.3.3. Honeybees and Other Terrestrial Invertebrates

The risk characterization for terrestrial invertebrates and honeybees uses the acute oral and contact NOAELs for technical sethoxydim from the 2001 HHERA. As shown in Table 11, honeybee exposure to sethoxydim via drift resulted in HQs <1, consistent with the 2001 HHERA, despite the higher application rate used in this Addendum. For terrestrial insects, upper-bound HQs slightly exceeded 1 for exposure to broadleaf vegetation by small insects (HQ of 1.4), exposure to short grass (HQ of 2), and exposure to long grass (HQ of 1.1). Note that these scenarios were not evaluated in the 2001 HHERA. For honeybees, no changes in risk were observed using the higher application rate in this Addendum compared to the 2001 HHERA. Slight risks exist to other terrestrial insects from exposure to sethoxydim on vegetation.

Table 11a. Hazard Quotients (HQs)¹ for Acute Exposures of Terrestrial Invertebrates and Honeybees to Sethoxydim – Backpack Directed Foliar

Exposure Scenario	2001 ²	2024
Honeybee: Drift	<1	<1
Terrestrial Insects: Fruit/large insects	NA	<1
Terrestrial Insects: Broadleaf/small insects	NA	<1-1.4
Terrestrial Insects: Short grass	NA	<1-2
Terrestrial Insects: Long grass	NA	<1-1.1

Table 11b. Hazard Quotients (HQs)1 for Acute Exposures of Terrestrial Invertebrates andHoneybees to Sethoxydim – Ground Broadcast Foliar

Exposure Scenario	2001 ²	2024
Honeybee: Drift	<1	<1
Terrestrial Insects: Fruit/large insects	NA	<1
Terrestrial Insects: Broadleaf/small insects	NA	<1-1.4
Terrestrial Insects: Short grass	NA	<1-2
Terrestrial Insects: Long grass	NA	<1-1.1

¹HQ ranges are for lower to upper-bound exposure estimates. HQs listed as <1 or \leq 1 (with no range) indicate that HQs for lower, central, and upper estimates are all \leq 1.

²HQs in the 2001 HHERA were not reported by application method.

Abbreviations: HHERA = Human Health and Ecological Risk Assessment; NA = not assessed

Key: Cells are colored for the highest HQ:

HQ≤1 HQ>1-<2 HQ≥2

4.3.3.4. Terrestrial Plants

The risk characterization for non-target terrestrial plants uses updated NOAELs for sethoxydim (based on data from studies using Poast) for sensitive and tolerant plants. Two of the four exposure scenarios evaluated in this Addendum (see Table 12) were also evaluated in the 2001 HHERA: direct spray/spray drift and runoff. For tolerant plants for both scenarios, HQs are <1 in this Addendum and in the 2001 HHERA. For sensitive plants, HQs are higher than in the 2001 HHERA. HQs for exposure to sethoxydim via runoff are slightly higher than those derived in the 2001 HHERA (upper-bound HQ of 4 versus 2001 upper-bound HQ of 2.6). However, HQs for sensitive non-target terrestrial plants due to direct spray and spray drift are much higher in this Addendum (upper-bound HQ of 163) than in the 2001 HHERA (HQ of 1.2). The two additional exposure scenarios not evaluated in 2001 are exposure due to irrigation and wind erosion. No HQs for either sensitive or tolerant plants exceeded 1 due to wind erosion; for irrigation, while tolerant plant HQs were <1, HQs for sensitive non-target terrestrial plants arged from <1 to 11. For non-target terrestrial plants, there is a high risk of damage for the direct spray/spray drift scenario. This is a significant change from the 2001 HHERA and is primarily due to the use of updated toxicity data with lower NOAELs. Since sethoxydim is an herbicide, serious risks to sensitive plants are expected.

Table 12a. Hazard Quotients (HQs)¹ for Exposure of Terrestrial Plants to Sethoxydim – Backpack Directed Foliar

Exposure Scenario	2001 ²	2024
Direct spray and spray drift	S: <1-1.2	S: <1-163
Direct spray and spray drift	T: <1	T: <1
Runoff	S: <1-2.6	S:<1-4
Runoff	T: <1	T: <1
Irrigation	NA	S: <1-11
Irrigation	NA	T: <1
Wind erosion	NA	S: <1
Wind erosion	NA	T: <1

Table 12b. Hazard Quotients (HQs)¹ for Exposure of Terrestrial Plants to Sethoxydim – Ground Broadcast Foliar

Exposure Scenario	2001 ²	2024
Direct spray and spray drift	S: <1-1.2	S: <1-163
Direct spray and spray drift	T: <1	T: <1
Runoff	S: <1-2.6	S: <1-4
Runoff	T: <1	T: <1
Irrigation	NA	S: <1-11
Irrigation	NA	T: <1
Wind erosion	NA	S: <1
Wind erosion	NA	T: <1

¹HQs listed as <1 or \leq 1 (with no range) indicate that HQs for lower, central, and upper estimates are all \leq 1. ²HQs in the 2001 HHERA were not reported by application method.

Abbreviations: HHERA = Human Health and Ecological Risk Assessment; NA = not assessed; S = sensitive species; T = tolerant species

Key: Cells are colored for the highest HQ:

HQ≤1 HQ>1-<2 HQ≥2

4.3.3.5. Aquatic Organisms

HQs for aquatic organisms based on exposure to sethoxydim are shown in Table 13. For fish, the risk characterization uses an updated acute NOAEC for sensitive species, the same acute NOAEC for tolerant species used in the 2001 HHERA, and chronic NOAECs for both tolerant and sensitive species (versus acute NOAECs used as a surrogate for chronic toxicity in the 2001 HHERA). HQs based on non-accidental acute exposure and chronic exposure for fish are not quantitatively or qualitatively different from those observed in the 2001 HHERA. For accidental exposure, however, HQs for both sensitive and tolerant fish species are much higher (upper-bound HQs of 22 and 8, respectively) than in the 2001 HHERA (HQs <1). For sensitive fish, this increase is due primarily to the use of a lower acute NOAEC; for tolerant fish, which used the same acute NOAEC in both risk evaluations, this increase is due to the higher application rate. For aquatic invertebrates, this Addendum uses the acute NOAEC for sensitive species used in the 2001 HHERA and an updated NOAEC for tolerant species. Similar to fish, HQs for the non-accidental acute exposure pathway are unchanged from the 2001 HHERA (HQs <1), while the accidental acute exposure pathway results in higher HQs for sensitive species (upper-bound HQs of 6) than in 2001 (HQs <1); HQs for tolerant species are unchanged from the 2001 HHERA (HQs <1). Given that the same acute NOAEC for sensitive aquatic invertebrates was used in both 2001 and this Addendum, the increase in risk is due to the increased application rate.

Table 13a. Hazard Quotients (HQs) 1 for Exposure of Aquatic Organisms to Sethoxydim – Backpac	:k
Directed Foliar	

Exposure Scenario	2001 ²	2024
Fish: Accidental acute ³	<1	S: <1-22
Fish: Accidental acute ³	<1	T: <1-8
Fish: Non-accidental acute	<1	S: <1
Fish: Non-accidental acute	<1	T: <1
Fish: Chronic/longer term	<1	S: <1
Fish: Chronic/longer term	<1	T: <1
Aquatic invertebrates: Accidental acute ³	<1	S: <1-3
Aquatic invertebrates: Accidental acute ³	<1	T: <1
Aquatic invertebrates: Non-accidental acute	<1	S: <1
Aquatic invertebrates: Non-accidental acute	<1	T: <1
Aquatic invertebrates: Chronic/longer term	<1	NA
Aquatic invertebrates: Chronic/longer term	<1	NA
Aquatic macrophytes: Accidental acute ³	<1	S: 6-255
Aquatic macrophytes: Accidental acute ³	<1	T: <1-36
Aquatic macrophytes: Non-accidental acute	<1	S: <1-2.0
Aquatic macrophytes: Non-accidental acute	<1	T: <1
Aquatic macrophytes: Chronic/longer term	<1	S: <1
Aquatic macrophytes: Chronic/longer term	<1	T: <1
Algae: Accidental acute ³	<1	S: <1-36
Algae: Accidental acute ³	<1	T: <1-36
Algae: Non-accidental acute	<1	S: <1
Algae: Non-accidental acute	<1	T: <1
Algae: Chronic/longer term	<1	S: <1
Algae: Chronic/longer term	<1	T: <1

Table 13b. Hazard Quotients (HQs) 1 for Exposure of Aquatic Organisms to Sethoxydim – Ground
Broadcast Foliar

Exposure Scenario	2001 ²	2024
Fish: Accidental acute ³	<1	S: <1-22
Fish: Accidental acute ³	<1	T: <1-8
Fish: Non-accidental acute	<1	S: <1
Fish: Non-accidental acute	<1	T: <1
Fish: Chronic/longer term	<1	S: <1
Fish: Chronic/longer term	<1	T: <1
Aquatic invertebrates: Accidental acute ³	<1	S: <1-3
Aquatic invertebrates: Accidental acute ³	<1	T: <1
Aquatic invertebrates: Non-accidental acute	<1	S: <1
Aquatic invertebrates: Non-accidental acute	<1	T: <1
Aquatic invertebrates: Chronic/longer term	<1	NA
Aquatic invertebrates: Chronic/longer term	<1	NA
Aquatic macrophytes: Accidental acute ³	<1	S: 6-255
Aquatic macrophytes: Accidental acute ³	<1	T: <1-36
Aquatic macrophytes: Non-accidental acute	<1	S: <1-2.0
Aquatic macrophytes: Non-accidental acute	<1	T: <1
Aquatic macrophytes: Chronic/longer term	<1	S: <1
Aquatic macrophytes: Chronic/longer term	<1	T: <1
Algae: Accidental acute ³	<1	S: <1-36
Algae: Accidental acute ³	<1	T: <1-36
Algae: Non-accidental acute	<1	S: <1
Algae: Non-accidental acute	<1	T: <1
Algae: Chronic/longer term	<1	S: <1
Algae: Chronic/longer term	<1	T: <1

¹HQs listed as <1 or \leq 1 (with no range) indicate that HQs for lower, central, and upper estimates are all \leq 1. ²HQs in the 2001 HHERA were not reported by application method.

³The 2001 HHERA discusses acute accidental exposure in the text of the report; however, the summary tables for the risk characterization do not list separate acute HQs for accidental and non-accidental acute. Given that all acute HQs for aquatic species in the 2001 HHERA were <1, it is assumed that HQs for the accidental acute exposure pathway were <1 in the 2001 HHERA.

Abbreviations: HHERA = Human Health and Ecological Risk Assessment; NA = not assessed; S = sensitive species; T = tolerant species

Key: Cells are colored for the highest HQ:

HQ≤1 HQ>1-<2 HQ≥2

NOAECs for aquatic macrophytes and algae used in the 2001 HHERA are used in this Addendum, except for the NOAEC for sensitive aquatic macrophytes, which was updated based on newer toxicity data. As shown in Table 13, similar to fish and aquatic invertebrates, risks from non-accidental acute and chronic exposure to sethoxydim (as Poast) did not qualitatively or quantitatively change from those observed in the 2001 HHERA (aside from sensitive aquatic macrophyte non-accidental acute exposure, with slightly higher HQs [upper-bound HQ of 2, versus HQ <1 in 2001]). The slight increase in HQs for sensitive aquatic macrophytes is primarily due to the updated NOAEC. HQs for the accidental acute exposure pathway for sensitive aquatic macrophytes

are extremely high compared to HQs observed in the 2001 HHERA, and HQs for tolerant aquatic macrophytes and algae (sensitive and tolerant species) are much higher than HQs observed in the 2001 HHERA. While the significantly increased HQs for sensitive aquatic macrophytes are primarily due to the change in the NOAEC, the difference in risks for tolerant aquatic macrophytes and algae are due to the higher application rate, as their toxicity values were the same in the 2001 HHERA and this Addendum.

For aquatic receptors, HQs for the acute accidental exposure scenario are extremely high and represent serious risks to all aquatic species, but risks from recommended use scenarios are none to minimal.

5. References

For this risk assessment Addendum, MRID studies were not available for review. All data attributed to specific MRID studies were taken from DERs developed by USEPA for MRID studies and are listed in the table below (sorted by MRID number). All other references cited in the document follow.

Table 14. MRID Studies

MRID	Citation
MRID47691701	Aufderheide, J. (2009) BAS 562 05 H (POAST): Acute toxicity test to the fathead minnow, Pimephales promelas, Determined Under Flow- Through Test Conditions. Project Number: 64117, 356157, 2009/7000068. Unpublished study prepared by ABC Laboratories, Inc. 46
MRID47691702	Aufderheide, J. (2009) BAS 562 H: Early life-stage toxicity test with the fathead minnow, Pimephales promelas, under flow-through test conditions. Project Number: 64012, 302018, 2009/7000078. Unpublished study prepared by ABC Laboratories, Inc. 69 p.
MRID47691703	Aufderheide, J. (2009) BAS 562 05 H (POAST): Early life-stage toxicity test with the fathead minnow, Pimephales promelas, under flow-through conditions. Project Number: 64010, 346309, 2009/7000077. Unpublished study prepared by ABC Laboratories, Inc. 83 p.
MRID47691704	Bergfield, A. (2009) BAS 562 05 H (POAST): Effects on the vegetative vigor of non-target terrestrial plants (tier II). Project Number: 64011, 302015, 2009/7000073. Unpublished study prepared by ABC Laboratories, Inc. 64 p.
MRID48000901	 Zok, S. (2009) BAS 562 H (Sethoxydim) - 1-Generation reproduction study on the mallard duck (Anas platyrhynchus) by administration in the diet. Project Number: 72W0530/085045, 302019, 2009/1100351. Unpublished study prepared by BASF SE: Experimental Toxicology and Ecology. 403 p.
MRID48000902	Knauert, S. (2010) Effect of BAS 562 05 H on growth of the aquatic plant Glyceria maxima (Including Amendment No. 1). Project Number: 302016, 2010/7003570. Unpublished study prepared by BASF SE. 73 p.
MRID50420001	Minderhout, T.; Oristian, K.; Gallagher, S. (2017) BAS 562 H: A flow- through life-cycle toxicity test with the cladoceran (Daphnia magna). Project Number: 147A/325, 782177, 2017/7007400. Unpublished study prepared by EAG Laboratories. 95p.
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Attachments

Attachment 1 – Poast Label

Attachment 2 – Literature Search Documentation

Attachment 3 – Documentation for Use of GLEAMS

Attachment 4 – Documentation for Worksheets Version 2.02 HHERAs

Attachment 5 – Studies of Toxicity to Ecological Receptors of Sethoxydim Published Since the 2001 HHERA

Attachment 1 – Poast Label



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY WASHINGTON, DC 20460

OFFICE OF CHEMICAL SAFETY AND POLLUTION PREVENTION

December 3, 2020

Craig Kleppe Product Registration Manager BASF Corporation 26 Davis Drive Research Triangle Park, NC 27709

Subject: PRIA Label Amendment – New Use on Basil and Caneberry PHI Change; Includes incorporation of label edits required by the Sethoxydim Interim Decision Product Name: POAST HERBICIDE EPA Registration Number: 7969-58 Application Dates: 5/24/2019 and 7/13/20 Decision Numbers: 551724, 551725, 568411

Dear Mr. Kleppe:

The application referred to above, submitted under the Federal Insecticide, Fungicide and Rodenticide Act, as amended is acceptable under FIFRA sec 3 (c)(5). The agency has also completed reviewing all the information submitted with your application to support the Registration Review of the above referenced product in connection with the Sethoxydim Interim Decision and has concluded that your submission is acceptable. You must submit and/or cite all data required for registration/reregistration/registration review of your product when the Agency requires all registrants of similar products to submit such data.

A stamped copy of your labeling is enclosed for your records. This labeling supersedes all previously accepted labeling. You must submit one (1) copy of the final printed labeling before you release the product for shipment with the new labeling. In accordance with 40 CFR 152.130(c), you may distribute or sell this product under the previously approved labeling for 12 months from the date of this letter. After 12 months, you may only distribute or sell this product if it bears this new revised labeling or subsequently approved labeling. "To distribute or sell" is defined under FIFRA section 2(gg) and its implementing regulation at 40 CFR 152.3.

Should you wish to add/retain a reference to the company's website on your label, then please be aware that the website becomes labeling under the Federal Insecticide Fungicide and Rodenticide Act and is subject to review by the Agency. If the website is false or misleading, the product would be misbranded and unlawful to sell or distribute under FIFRA section 12(a)(1)(E). 40 CFR 156.10(a)(5) list examples of statements EPA may consider false or misleading. In addition, regardless of whether a website is referenced on your product's label, claims made on the website may not substantially differ from those claims approved through the registration process. Therefore, should the Agency find or if it is brought to our attention that a website contains false or misleading statements or claims substantially differing from the EPA approved registration, the website will be referred to the EPA's Office of Enforcement and Compliance.

Page 2 of 2 EPA Reg. No. 7969-58 Decision No. 551724, 551725, 568411

Your release for shipment of the product constitutes acceptance of these conditions. If these conditions are not complied with, the registration will be subject to cancellation in accordance with FIFRA section 6. If you have any questions, please contact Sarah Meadows by phone at 703-347-0505, or via email at meadows.sarah@epa.gov@epa.gov.

Sincerely,

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Daniel Kenny, Chief Herbicide Branch Registration Division (7505P) Office of Pesticide Programs

Enclosure



007969-00058.20190417c.NVA	2019-04-025-0074

Research Triangle Park, NC 27709

Poast® herbicide (EPA Reg. No. 7969-58)

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[residential use]	



ACCEPTED 12/3/2020

Under the Federal Insecticide, Fungicide and Rodenticide Act as amended, for the pesticide registered under EPA Reg. No. 7969-58



Poast[®] Herbicide

For broad-spectrum, postemergence selective control of annual and perennial grass weeds in select crops and other labeled use sites

Active Ingredient:

sethoxydim: 2-[1-(ethoxyimino)butyl]-5-[2-(ethylthio)propyl]-3-hydroxy-2-	
cyclohexen-1-one*	18.0%
Other Ingredients:	<u>82.0%</u>
Total:	00.0%
* Equivalent to 1.5 pounds of sethoxydim per gallon formulated as an emulsifiable concentrate	

EPA Reg. No. 7969-58

EPA Est. No.

KEEP OUT OF REACH OF CHILDREN WARNING/AVISO

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

See full label for complete **First Aid**, **Precautionary Statements**, **Directions For Use**, **Conditions of Sale and Warranty**, and state-specific crop and/or use site restrictions.

In case of an emergency endangering life or property involving this product, call day or night 1-800-832-HELP (4357).

Net Contents:

FIRST AID	
If in eyes	 Hold eyes open and rinse slowly and gently with water for 15 to 20 minutes. Remove contact lenses, if present, after first 5 minutes; then continue rinsing eyes. Call a poison control center or doctor for treatment advice.
If on skin or clothing	 Take off contaminated clothing. Rinse skin immediately with plenty of water for 15 to 20 minutes. Call a poison control center or doctor for treatment advice.
If swallowed	 Call a poison control center or doctor immediately for treatment advice. DO NOT give any liquid to the person. DO NOT induce vomiting unless told to do so by a poison control center or doctor. DO NOT give anything by mouth to an unconscious person.
If inhaled	 Move person to fresh air. If person is not breathing, call 911 or an ambulance; then give artificial respiration, preferably by mouth to mouth, if possible. Call a poison control center or doctor for further treatment advice.
HOTLINE NUMBER	
Have the product contain	per or label with you when calling a poison control center or doctor or going for treatment

Have the product container or label with you when calling a poison control center or doctor or going for treatment. In case of medical emergency involving this product, call BASF Corporation at 1-800-832-HELP (4357) or dial 911.

NOTE TO PHYSICIAN

Probable mucosal damage may contraindicate the use of gastric lavage. Contains petroleum distillate. Vomiting may cause aspiration pneumonia.

Precautionary Statements

Hazards to Humans and Domestic Animals

WARNING. Causes substantial but temporary eye injury. Causes skin irritation. Harmful if absorbed through skin or swallowed. **DO NOT** get in eyes, on skin, or on clothing.

Personal Protective Equipment (PPE)

Applicators and other handlers must wear:

- Coveralls over short-sleeved shirt and short pants
- Chemical-resistant gloves, made of barrier laminate, nitrile rubber ≥ 14 mils, butyl rubber ≥ 14 mils, or viton ≥ 14 mils
- Chemical-resistant footwear plus socks
- Protective eyewear
- Chemical-resistant headgear for overhead exposure
- Chemical-resistant apron when cleaning equipment, mixing, and loading

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. **DO NOT** reuse them. Follow manufacturer's instructions for cleaning and maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

Engineering Controls Statement

When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

USER SAFETY RECOMMENDATIONS

Users should:

- Wash hands thoroughly after handling and before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

Environmental Hazards

This product is toxic to aquatic organisms. For terrestrial uses, **DO NOT** apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark. **DO NOT** contaminate water when disposing of equipment washwater or rinsate.

Nontarget Organism Advisory: This product is toxic to plants and may adversely impact the forage and habitat of non-target organisms, including pollinators, in areas adjacent to the treated site. Protect the forage and habitat of nontarget organisms by following label directions intended to minimize spray drift.

Endangered Species Concerns

NOTE: The use of any pesticide in a manner that may kill or otherwise harm an endangered species or adversely modify their habitat is a violation of federal law. This pesticide is toxic to vascular plants and should be used strictly in accordance with drift precautions on this label to minimize off-site exposures.

Physical and Chemical Hazards

COMBUSTIBLE. DO NOT use or store near heat or open flame.

Directions For Use

It is a violation of federal law to use this product in a manner inconsistent with its labeling. This label must be in possession of the user at the time of herbicide application.

DO NOT apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For requirements specific to your state or tribe, consult the agency responsible for pesticide regulation.

Observe all precautions and limitations in this label and the labels of products used in combination with **Poast® herbicide**. Use of **Poast** not consistent with this label can result in injury to crops, animals, or persons.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

DO NOT enter or allow worker entry into treated areas during the restricted-entry interval (REI) of **12 hours**.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water is:

- Coveralls over short-sleeved shirt and short pants
- Chemical-resistant gloves, made of barrier laminate, nitrile rubber ≥ 14 mils, butyl rubber ≥ 14 mils, or viton ≥ 14 mils
- Chemical-resistant footwear plus socks
- Protective eyewear
- Chemical-resistant headgear for overhead exposure

NONAGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard (WPS) for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

DO NOT enter or allow others to enter treated areas until sprays have dried.

STORAGE AND DISPOSAL

DO NOT contaminate water, food, or feed by storage or disposal.

Pesticide Storage

DO NOT allow this product to freeze. **DO NOT** store below 32° F or above 100° F. Store in original container only, in a dry place away from heat or open flame, and separate from feed or foodstuffs.

Pesticide Disposal

To avoid pesticide waste, use all material in this container by application according to label directions. If pesticide waste cannot be avoided, offer remaining product to a waste disposal facility or pesticide disposal program (often such programs are run by state or local governments or by industry).

Container Handling

Nonrefillable Container. DO NOT reuse or refill this container. Triple rinse or pressure rinse container (or equivalent) promptly after emptying; then offer for recycling, if available, or reconditioning, if appropriate, or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures approved by state and local authorities.

Triple rinse containers small enough to shake (capacity ≤ 5 gallons) as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank, or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times.

(continued)
STORAGE AND DISPOSAL (continued)

Container Handling (continued) Triple rinse containers too large to shake (capacity > 5 gallons) as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank, or store rinsate for later use or disposal. Repeat this procedure two more times.

Pressure rinse as follows: Empty the remaining contents into application equipment or mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank, or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container and rinse at about 40 PSI for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

Refillable Container. Refill this container with pesticide only. DO NOT reuse this container for any other purpose. Triple rinsing the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller.

Triple rinse as follows: To clean the container before final disposal, empty the remaining contents from this container into application equipment or mix tank. Fill the container about 10% full with water. Agitate vigorously or recirculate water with the pump for 2 minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times.

When this container is empty, replace the cap and seal all openings that have been opened during use; return the container to the point of purchase or to a designated location. This container must only be refilled with a pesticide product. Prior to refilling, inspect carefully for damage such as cracks, punctures, abrasions, worn-out threads and closure devices. Check for leaks after refilling and before transport. DO NOT transport if this container is damaged or leaking. If the container is damaged, or leaking, or obsolete and not returned to the point of purchase or to a designated location, triple rinse emptied container and offer for recycling, if available, or dispose of container in compliance with state and local regulations.

Steps to take if this material is released into the environment or spilled:

- Wear Personal Protective Equipment (PPE) and avoid exposure when managing a spill. (See Precautionary Statements section of this label for required PPE.)
- Dike and contain the spill with inert, absorbent material (e.g., sand, earth) and transfer liquid and solid diking material to separate containers for disposal. Small-scale spills of **Poast[®] herbicide** (that can be cleaned up with a typical spill kit) may be applied to labeled sites.
- Remove contaminated clothing, and wash affected skin areas with soap and water. Wash clothing before reuse.
- Keep spill out of all sewers and open bodies of water.

Use Restrictions

- Maximum annual application rate Refer to the Use-specific Information section of the label for each crop use.
- Preharvest interval (PHI) Refer to the Use-specific Information section of the label.
- **DO NOT** apply preplant or preemergence before planting grass crops except field corn. Refer to Use-specific Information.
- DO NOT plant harvestable crops for 30 days after application unless sethoxydim is labeled for use on that crop.
- Avoid all direct or indirect contact with any desired grass crop (e.g., corn, rice, small grains, sorghum, and ornamental grasses and turfgrass).
- Stress DO NOT apply to grass weeds or crops under stress because of lack of moisture, hail damage, flooding, herbicide injury, mechanical injury, or widely fluctuating temperatures. Unsatisfactory control may result. In irrigated areas, it may be necessary to irrigate before application to ensure active grass weed growth.
- **DO NOT** apply to crops that show injury (leaf phytotoxicity or plant stunting) produced by any other prior herbicide applications because this injury may be enhanced or prolonged with new or additional herbicide application.
- Re-treatment Interval A minimum of 14 days is required between sequential applications of Poast.
- **DO NOT** use selective application equipment such as recirculating sprayers, wiper applicators, or shielded applicators.
- **DO NOT** apply through any type of irrigation equipment.
- Rainfast period Poast is rainfast 1 hour after application.

In Case of Emergency

In case of a spill of this product, call:

- CHEMTREC
- 1-800-424-9300 BASF Corporation 1-800-832-HELP (4357)

Product Information

Poast® herbicide is a broad-spectrum, postemergence herbicide for selective control of annual and perennial grass weeds listed in **Table 1**. **Poast** does not control sedges or broadleaf weeds. Refer to **Table 2** for crops and other use sites to which **Poast** can be applied.

Table 1. Grass Weeds Controlled			
Annual Gr	ass Weeds		
Barley, interseeded cover crops ¹ and volunteer	Oats, interseeded cover crops ^{1,2} and volunteer		
Barnyardgrass	Oats, tame		
Corn, volunteer	Oats, wild		
Crabgrass, large	Orchardgrass (seedling)		
Crabgrass, smooth	Panicum, browntop		
Cupgrass, southwestern	Panicum, fall		
Cupgrass, woolly	Panicum, Texas		
Fescue, tall (seedling)	Red rice		
Foxtail, giant	Rye, interseeded cover crops ¹ and volunteer		
Foxtail, green	Ryegrass, annual		
Foxtail, yellow	Sandbur, field		
Goosegrass	Shattercane/Wildcane		
Itchgrass	Signalgrass, broadleaf		
Johnsongrass (seedling)	Sprangletop, red		
Junglerice	Stinkgrass		
Lovegrass	Wheat, interseeded cover crops ¹ and volunteer		
Millet, wild proso	Witchgrass		
Perennial G	irass Weeds		
Bermudagrass	Muhly, wirestem		
Guineagrass	Quackgrass		
Johnsongrass (no-till)	Ryegrass, perennial		
Johnsongrass (rhizome)	Torpedograss		
¹ As interseeded cover crops grown with non-grass or broadleaf crops listed in the Use-specific Information section of this label. Apply to cereals before tillering and at a height of 3 to 4 inches.			
² As interseeded oats in alfalfa, birdsfoot trefoil, clover.			

and sainfoin. To be most effective, make application before the interseeded oats reach the boot stage.

Crop Tolerance

All crops listed on this label are tolerant to **Poast** at all stages of growth.

Table 2. Crops and Other	Use Sites
Alfalfa, Birdsfoot trefoil, Sainfoin (dry and undried)	Horseradish
Apricot (bearing)	Leafy Vegetables
Artichoke, globe	Lentil
Asparagus	Lingonberry, Salal, Juneberry
Avocado (nonbearing)	Mint
Basil, dried and fresh	Nectarine (bearing)
Beans, dry and succulent	Nonagricultural Land
Beet, garden/table	Okra
Beet, sugar (see Sugar Beet)	Olive (nonbearing)
Blueberry	Orchard Floor Middles (growth management)
Borage	Peach (bearing)
Brassica Vegetables	Peanut
Buckwheat	Peas, dry and succulent
Bulb Vegetables	Pistachio
Caneberries	Plum (nonbearing)
Carrot	Pome Fruits
Cherry, sweet and tart (bearing and nonbearing)	Pomegranate (nonbearing)
Citrus	Potato, field
Clover	Potato, sweet
Conservation Reserve Land (CRP)	Prune (nonbearing)
Corn, field	Rapeseed Subgroup
including Poast® Protected hybrids	(excluding borage and flax)
Corn, sweet (Poast[®] Protected hybrids ONLY)	Root Vegetables Subgroup (excluding sugar beet)
Cotton	Safflower
Cranberry	Soybean
Crops Grown for Seed	Strawberry
Cucurbit Vegetables	Sugar Beet
Date (nonbearing)	Sunflower
Dill	Tall Fescue Growth Suppression (in Nonagricultural Land)
Fig (nonbearing)	Tobacco
Fine Fescue Grown for Turfgrass Seed	Tomato
Flax	Tree Nuts
Fruiting Vegetables	Tuberous and Corm
(excluding tomato)	Vegetables
Grape	Wildlife Food Plots
Head-type and Petiole-type Vegetables	

Mode of Action

Sethoxydim, the active ingredient in **Poast® herbicide**, is a graminicide which inhibits the enzyme acetyl CoA carboxylase (ACCase), resulting in cessation of fatty acid synthesis which is essential for new growth. **Poast** rapidly enters the targeted grass weed through the foliage and translocates throughout the plant. Effects range from slowing or stopping growth (typically within 2 days) to foliage reddening and leaf tip burn. Foliage burnback may occur later. Whole plant death occurs over approximately 3 weeks. Sethoxydim is classified in **Group 1** by the Weed Science Society of America (WSSA) and **Group A** by the Herbicide Resistance Action Committee (HRAC).

Herbicide Resistance Management

Poast is a **Group 1** herbicide. Any weed population may contain or develop plants naturally resistant to **Poast** and other **Group 1** herbicides. Weed species with resistance to **Group 1** may eventually dominate the weed population if **Group 1** herbicides are used repeatedly in the same field or in successive years as the primary method of control for targeted species. This may result in partial or total loss of control of those species by **Poast** or other **Group 1** herbicides.

To delay herbicide resistance consider:

- Avoiding the consecutive use of **Poast** or other target site-of-action **Group 1** herbicides that have a similar target site of action on the same weed species.
- Using tank mixes or premixes with herbicides from different target-site-of-action groups as long as the involved products are all registered for the same use, have different sites of action, and are both effective at the tank mix or prepack rate on the weed(s) of concern.
- Basing herbicide use on a comprehensive IPM (Integrated Pest Management) program including cultural and mechanical methods.
- Monitoring treated weed populations for loss of field efficacy, and controlling escapes with effective alternative herbicides or mechanical methods.
- Identifying weeds present in the field through scouting and field history and understanding their biology. The weed-control program needs to consider all of the weeds present.
- Scouting fields prior to application to identify the weed species present and their growth stage to determine if the intended application will be effective.
- Scouting fields after application to verify the treatment was effective.
- Suspected herbicide-resistance weeds may be identified by these indicators:
 - 1. Failure to control a weed species normally controlled by the herbicide at the dose applied, especially if control is achieved on adjacent weeds;
- 2. A spreading patch of non-controlled plants of a particular weed species; and
- 3. Surviving plants mixed with controlled individuals of the same species.

- If resistance is suspected, treat weed escapes with an herbicide with a different MOA and/or use nonchemical methods to remove escapes, as practical, with the goal of preventing further seed production.
- Report any incidence of non-performance of this product against a particular weed species to your local BASF representative.
- Contacting your local extension specialist, certified crop advisors, and/or manufacturer for herbicide resistance management and/or integrated weed management directions for specific crops.

Cultivation

DO NOT cultivate within 5 days before or 7 days after applying **Poast**. Cultivating 7 days or more after application may help provide season-long weed control.

Spray Drift Advisory

The applicator is responsible for avoiding off-site spray drift. Be aware of nearby nontarget sites and environmental conditions.

Importance of Droplet Size

An effective way to reduce spray drift is to apply large droplets. Use the largest droplets that provide target pest control. While applying larger droplets will reduce spray drift, the potential for drift will be greater if applications are made improperly or under unfavorable environmental conditions.

Controlling Droplet Size – Ground Boom

- **Volume** Increasing the spray volume so that larger droplets are produced will reduce spray drift. Use the highest practical spray volume for the application. If a greater spray volume is needed, consider using a nozzle with a higher flow rate.
- **Pressure** Use the lowest spray pressure recommended for the nozzle to produce the target spray volume and droplet size.
- **Spray Nozzle** Use a spray nozzle that is designed for the intended application. Consider using nozzles designed to reduce drift.

Controlling Droplet Size – Aircraft

• Adjust Nozzles - Follow nozzle manufacturer's recommendations for setting up nozzles. Generally, to reduce fine droplets, nozzles should be oriented parallel with the airflow in flight.

Boom Height - Ground Boom

For ground equipment, the boom should remain level with the crop and have minimal bounce.

Release Height - Aircraft

Higher release heights increase the potential for spray drift.

Shielded Sprayers

Shielding the boom or individual nozzles can reduce spray drift. Consider using shielded sprayers. Verify that the shields are not interfering with the uniform deposition of the spray on the target area.

Temperature and Humidity

When making applications in hot and dry conditions, use larger droplets to reduce effects of evaporation.

Temperature Inversion

Drift potential is high during a temperature inversion. Temperature inversions are characterized by increasing temperature with altitude and are common on nights with limited cloud cover and light to no wind. The presence of an inversion can be indicated by ground fog or by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing. Avoid application during temperature inversions.

Wind

Drift potential generally increases with wind speed. AVOID APPLICATIONS DURING GUSTY WIND CONDITIONS. Applicators need to be familiar with local wind patterns and terrain that could affect spray drift.

Boomless Ground Applications

Setting nozzles at the lowest effective height will help to reduce the potential for spray drift.

Handheld Technology Applications

Take precautions to minimize spray drift.

Tank Mixing Information

It is the pesticide user's responsibility to ensure that all products are registered for the intended use. Read and follow the applicable restrictions and limitations and directions for use on all product labels involved in tank mixing. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture.

Poast® herbicide is a broad-spectrum, postemergence herbicide for selective control of annual and perennial grass weeds. For broadleaf weed control, **Poast** should be used in combination with, or in sequence with, effective broadleaf herbicides approved for use. Refer to the **Usespecific Information** section of this label for tank mixing restrictions.

Physical incompatibility, reduced grass weed control, or crop injury may result from mixing **Poast** with other pesticides (fungicides, herbicides, insecticides, or miticides), additives, or fertilizers not recommended on this label.

Before mixing components, always perform a compatibility test in a quart-size jar. Add components in the same order as listed in the **Mixing Order** section of this label.

Compatibility Test for Tank Mix Components

- 1. For a 20 gallons per acre spray volume, start with 3.3 cups (800 mL) of water from the intended source at the source temperature. For other spray volumes, adjust rates accordingly. For each dry product, add 2 teaspoons per pound of product per acre. For each liquid product, add 1 teaspoon per pint of product per acre.
- 2. Always cap the jar and invert 10 times between component additions.
- 3. When the components have all been added to the jar, let the solution stand for 15 minutes.
- 4. **Evaluate** the solution for uniformity and stability. The spray solution should not have free oil on the surface; fine particles that precipitate to the bottom; or a thick (clabbered) texture. **DO NOT** use any spray solution that could clog spray nozzles.

Additives

To achieve consistent postemergence grass weed control with **Poast**, always use a crop oil concentrate (COC) or methylated/modified seed oil (MSO) as directed in **Table 3**. In addition, ammonium sulfate (AMS) or urea ammonium nitrate (UAN) will enhance activity on certain grass weed species in certain crops (refer to the **Use-specific Information** section).

NOTE: Using **Poast** with adjuvants at temperature above 90° F (or anytime the temperature exceeds 100° F regardless of the humidity) and relative humidity at or above 60% may result in injury to many vegetable crops.

Consult your BASF Corporation representative or Cooperative Extension agent for more information on the use of additives.

Table 3. Additive Rate per Acre - Aerial and

Ground Applications				
Additive	Rate/Acre			
AMS	2.5 pounds			
COC	2.0 pints			
MSO	1.5 pints			
UAN	4.0 to 8.0 pints			

Crop Oil Concentrate or Methylated Seed Oil

COC or MSO must contain either a petroleum-oil or vegetable-oil base and meet all of the following criteria. (**NOTE:** Highly refined vegetable oils mix better than unrefined vegetable oils.)

- Contain emulsifiers
- Contain only EPA-exempt ingredients
- Be nonphytotoxic
- Provide good mixing quality in the compatibility jar test
- Show success in local use/experience

Nitrogen Source

Add nitrogen to COC or MSO to improve grass weed control for species as listed in **Table 5**, **Table 6**, and **Table 7**.

Urea Ammonium Nitrate (28%, 30%, or 32% nitrogen solution)

- UAN may be used in addition to COC to improve grass weed control.
- **DO NOT** use brass or aluminum nozzles when spraying UAN.

Ammonium Sulfate

• AMS may be substituted for UAN.

- When liquid AMS is used, substitute 3.0 quarts of 8-8-0 analysis for 2.5 pounds of dry AMS.
- Use high-quality AMS (i.e., spray grade) to avoid plugging spray nozzles. Other sources of nitrogen are not as effective.
- If AMS is added directly to the spray tank, add it slowly while agitating. Adding AMS too quickly may clog outlet lines. Ensure AMS is completely dissolved before adding any other products.
- AMS, if applied at less than 10 gallons per acre, may cause potential precipitation and clogging.

NOTE: Because most nitrogen solutions are mildly corrosive to galvanized, mild steel, and brass spray equipment, rinse the entire spray system with water soon after use.



Regional Descriptions

Application Instructions

Apply **Poast® herbicide** to actively growing grass weeds by aerial or ground application at the rates and timing (maximum height) listed in **Table 5** (annual grass weeds), **Table 6** (perennial grass weeds), and **Table 7** (early and rescue treatments to control select annual grass weeds), as instructed in the **Use-specific Information** section of this label. For small area application or spot application, refer to **Table 8**. **NOTE:** The most effective control will be achieved by applying postemergence applications of **Poast** early in the growing season, when grass weeds are small. **Poast** may not be effective on grass weeds that have grown taller than the maximum heights listed.

Apply **Poast** to the foliage of grass weeds uniformly and completely; large leaf canopies shelter smaller grass weeds and can prevent adequate spray coverage. **DO NOT** spray to the point of runoff.

Irrigation

In irrigated areas, it may be necessary to irrigate before application of **Poast® herbicide** to ensure active grass weed growth.

Cleaning Application Equipment

Clean application equipment thoroughly by using a strong detergent or commercial sprayer cleaner according to the manufacturer's directions, followed by triple rinsing the equipment before and after applying **Poast**.

Mixing Order

Maintain agitation throughout mixing and application.

- 1. **Water** Fill tank 3/4 full of clean water and start agitation.
- 2. **Inductor** If an inductor is used, rinse it thoroughly after each component has been added.
- 3. **Products in PVA bags** Place any product contained in water-soluble PVA bags into the mixing tank. Wait until all water-soluble PVA bags have fully dissolved and the product is evenly mixed in the spray tank before continuing.
- 4. **Water-soluble additives** (including dry and liquid fertilizers such as AMS or UAN)
- 5. **Water-dispersible products** (such as dry flowables, wettable powders, suspension concentrates, or suspo-emulsions)
- 6. Water-soluble products
- 7. Emulsifiable concentrates (such as Poast or COC)
- 8. Remaining quantity of water

Aerial Application Methods and Equipment

The interaction of many equipment-related and weatherrelated factors determines the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making application decisions.

DO NOT apply under circumstances where possible drift to unprotected persons; to food, forage, or other plantings that might be damaged; or to crops that would then be unfit for sale, use, or consumption can occur.

The following drift management requirements must be followed to avoid off-target drift movement from aerial applications to agricultural field crops. These requirements **DO NOT** apply to forestry applications, public health uses, or to applications using dry formulations.

- 1. The distance of the outermost nozzles on the boom must not exceed 3/4 the length of the fixed wingspan or rotor blade diameter.
- Nozzles must always point backward parallel with the airstream and never point downward more than 45 degrees.

Where a state has more stringent regulations, they must be observed. The applicator should be familiar with and take into account the information covered in the **Spray Drift Reduction Advisory Information** section of this label.

Ground Application Methods and Equipment (Broadcast)

- Apply with nozzle height no more than 4 feet above ground or crop canopy.
- **DO NOT** apply when conditions favor drift from target area or when wind speed is greater than 10 mph.
- **DO NOT** use selective application equipment such as recirculating sprayers or wiper applicators.

Water Volume. Use 5 to 20 gallons of spray solution per acre. In **Region 1** (the West and High and Rolling Plains Region; refer to **Regional Descriptions**), **DO NOT** use less than 10 gallons of spray solution per acre.

Spray Pressure. Use 40 to 60 PSI (measured at the boom, not at the pump or in the line). When crop foliage and grass weed foliage are dense, use a maximum of 20 gallons of water per acre and 60 PSI.

Application Equipment. Use standard high-pressure pesticide flat fan or hollow cone nozzles spaced up to 20 inches apart. **DO NOT** use flood, whirl chamber, or controlled droplet applicator nozzles because erratic coverage can cause inconsistent grass weed control. To control tall grass weeds, such as volunteer corn, the boom should be high enough to cover the entire plant. Refer to the nozzle manufacturer's directions for recommended height. When a crop, such as cotton, is 24 inches or taller and the grass weeds are below the crop canopy, use drop nozzles to ensure good coverage of grass weeds.

Ground Application Methods and Equipment (Banding)

- **Poast** may be applied by banding to control annual grass weeds.
- **DO NOT** make banding applications to control perennial grass weeds.
- For banding applications, follow the directions in the **Ground Application Methods and Equipment** (**Broadcast**) section of this label.

When applying **Poast** by banding, use the following formulas to calculate the amount of herbicide and water volume needed:

Bandwidth in inches		Broadcast		Banding
	Х	rate	=	herbicide
Row width in inches		per acre		rate per acre
Bandwidth in inches	v	Broadcast	_	Banding

Application Rate

Grass weed application rate and timing (maximum height) are based on growing regions as described in the **Regional Descriptions** section of this label. **Follow the directions for your region only.**

Amount of Poast [®] herbicide (pints/A)	Amount of Sethoxydim (Ibs ai/A)
0.5	0.09
0.75	0.14
1.0	0.19
1.25	0.23
1.5	0.28
2.0	0.38
2.5	0.49
3.0	0.56
4.0	0.75
4.5	0.84
5.0	0.94
5.5	1.03
6.5	1.22
7.5	1.41
8.0	1.50
10.0	1.88

Table 4. Use Rate Equivalency

Annual Grass Weeds

Table 5. Application Rate and Timing (Maximum Height) - Annual Grass Weeds						
Annual Crass Weeds	Regi (West and High a	on 1 nd Rolling Plains)	Region 2 (Midwest, South, and Northeast)			
Annual Grass weeds	Maximum Height (inches)	Product Rate (pints/A)	Maximum Height (inches)	Product Rate (pints/A)		
Barley, interseeded cover crops and volunteer ^{1,2,4}	4	2.0	4	1.5		
Barnyardgrass	8	1.5	8	1.0		
Corn, volunteer ^{1,2,4}	12	1.5	20	1.0		
Crabgrass, large ¹	4	1.5	6	1.0		
Crabgrass, smooth ¹	4	1.5	6	1.0		
Cupgrass, southwestern	8	1.5	N/A	N/A		
Cupgrass, woolly	N/A	N/A	8	1.0		
Fescue, tall (seedling)	N/A	N/A	6	1.5		
Foxtail, giant	8	1.5	8	1.0		
Foxtail, green	8	1.5	8	1.0		
Foxtail, yellow	8	1.5	8	1.0		
Goosegrass	4	1.5	6	1.0		
Itchgrass	N/A	N/A	4	2.0		
Johnsongrass (seedling)	8	1.5	8	1.0		
Junglerice	8	1.5	8	1.0		

Table 5. Application Rate and Timing (Maximum Height) - Annual Grass Weeds (continued)						
Appual Grass Woods	Regi (West and High a	on 1 nd Rolling Plains)	Region 2 (Midwest, South, and Northeast)			
Annual Glass Weeus	Maximum Height (inches)	Product Rate (pints/A)	Maximum Height (inches)	Product Rate (pints/A)		
Lovegrass	N/A	N/A	6	1.5		
Millet, wild proso	10	1.0	10	0.5		
Oats, interseeded cover crops and volunteer ^{1,2,4}	4	2.0	4	1.5		
Oats, tame	N/A	N/A	6	1.5		
Oats, wild ¹	4	1.5	4	1.0		
Orchardgrass (seedling)	N/A	N/A	6	1.5		
Panicum, browntop	8	1.5	8	1.0		
Panicum, fall	8	1.5	8	1.0		
Panicum, Texas	8	1.5	8	1.0		
Red rice ¹	N/A	N/A	4	2.0		
Rye, interseeded cover crops and volunteer ^{1,2,4}	4	2.0	4	1.5		
Ryegrass, annual	8	1.5	8	1.0		
Sandbur, field	N/A	N/A	3	1.25		
Shattercane/Wildcane1	18	1.5	18	1.0		
Signalgrass, broadleaf	8	1.5	8	1.0		
Sprangletop, red ³	8	1.5	8	1.0		
Stinkgrass	N/A	N/A	6	1.5		
Wheat, interseeded cover crops and volunteer ^{1,2,4}	4	2.0	4	1.5		
Witchgrass ¹	8	1.5	8	1.0		

¹ Add nitrogen to COC or MSO to improve control.

²Apply **Poast[®] herbicide** before tillering.

³ **DO NOT** apply **Poast** on red sprangletop in Arizona, California, or western New Mexico.

⁴ In **Region 1**, volunteer cereals emerging from late spring through early summer (May through July) may be partially or incompletely controlled because of unfavorable conditions at application time.

N/A = Not Applicable

Perennial Grass Weeds

Table 6. Application Rate and Timing (Maximum Height) - Perennial Grass Weeds*						
Perennial Grass Weeds	Region 1 (West and High and Rolling Plains)		Region 2 (Midwest, South, and Northeast)			
First Application	Maximum Height (inches)	Product Rate (pints/A)	Maximum Height (inches)	Product Rate (pints/A)		
Bermudagrass	6 (stolon)	2.0** to 2.5*	6 (stolon)	1.5		
Guineagrass	N/A	N/A	8	2.5		
Johnsongrass (no-till)	N/A	N/A	20	1.5		
Johnsongrass (rhizome)	10	1.5** to 2.5*	25	1.5		
Muhly, wirestem	N/A	N/A	6	1.25		
Quackgrass ¹	8	2.5	8	1.5		
Ryegrass, perennial	8	1.5	8	1.5		
Torpedograss	N/A	N/A	8	2.5		
Sequential Application	Maximum Height (inches)	Product Rate (pints/A)	Maximum Height (inches)	Product Rate (pints/A)		
Bermudagrass	4 (stolon)	1.5**	4 (stolon)	1.0		
Guineagrass	N/A	N/A	8	2.5		
Johnsongrass (no-till)	N/A	N/A	12	1.0		
Johnsongrass (rhizome)	8	1.0 to 1.5**	12	1.0		
Muhly, wirestem	N/A	N/A	6	1.25		
Quackgrass ¹	8	1.5	8	1.0		
Ryegrass, perennial	8	1.5	8	1.5		
Torpedograss	N/A	N/A	8	2.5		
¹ Add nitrogen to COC or MSO	to improve control. Cult	ivate 7 to 14 days aft	er first or sequential ap	plication.		

* Allow a minimum of 14 days between sequential applications.

** Use 2.5 pints per acre for the following forage crops: alfalfa, birdsfoot trefoil, clover, and sainfoin.

N/A = Not Applicable

Early Treatment and Rescue Treatment to Control Select Annual Grass Weeds in Region 2 (Midwest, South, and Northeast)

- If **Poast[®] herbicide** cannot be applied at the specified height, taller annual grass weeds may be controlled with a later application by increasing the rate of **Poast** as directed in **Table 7**.
- **DO NOT** exceed the maximum application rate per acre per season as listed in **Use-specific Information** section of the label.

Table 7. Early Treatment and Rescue Treatment to Control Select Annual Grass Weeds in Region 2						
	Early Tre	eatment	Rescue Treatment			
Annual Grass Weeds	Maximum Height (inches)	Product Rate (pints/A)	Maximum Height (inches)	Product Rate (pints/A)		
Barnyardgrass	4	0.75*	12	1.5		
Crabgrass, large ¹	N/A	N/A	8	1.5		
Crabgrass, smooth ¹	N/A	N/A	8	1.5		
Foxtail, giant ²	4	0.75	16	1.5		
Foxtail, green ²	4	0.75	16	1.5		
Foxtail, yellow ²	N/A	N/A	16	1.5		
Goosegrass	3	0.75	8	1.5		
Johnsongrass (seedling)	N/A	N/A	16	1.5		
Millet, wild proso	10	0.5	24	1.0		
Panicum, fall	4	0.75	12	1.5		
Panicum, Texas	4	0.75	12	1.0		
Signalgrass, broadleaf	4	0.75	12	1.5		
Volunteer, corn ¹	12	0.75	N/A	N/A		

¹ Add nitrogen to COC or MSO to improve control.

² For flax, use 0.5 pint per acre when foxtail is less than 1.5 inches high. When using the early treatment rate, foxtail species should not have started to tiller.

* Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, **Texas, and Virginia** - Use 1.0 pint per acre.

N/A = Not Applicable

Small Area Application or Spot Application

- **DO NOT** make small area application or spot application in addition to broadcast or banding applications on the same area.
- When using knapsack sprayers or high-volume spray equipment with handguns or other suitable nozzle arrangements, prepare a 1.0% to 1.5% spray solution of **Poast® herbicide** in water unless otherwise directed in the **Use-specific Information** section of this label.
- Use a concentration of 1% crop oil concentrate (COC) or methylated seed oil (MSO). Prepare the desired volume of spray solution by mixing the amount of **Poast** and the amount of COC or MSO in water according to **Table 8**.

Table 8. Spray Solution Dilution - Small Area Application or Spot Application					
Spray Solution Volume	COC/MSO		Poast	Spray S	olution
(gallons)	(1%)		1.0%*		1.5%**
1	1.3 fl ozs		1.3 fl ozs		1.9 fl ozs
3	3.8 fl ozs		3.8 fl ozs		5.8 fl ozs
5	6.4 fl ozs	AND	6.4 fl ozs	Un	9.6 fl ozs
25	2.0 pints		2.0 pints		3.0 pints
50	4.0 pints		4.0 pints		6.0 pints
100	8.0 pints		8.0 pints		12.0 pints

2 tablespoons = 1 fluid ounce

*Annual grass weeds up to 6-inches tall

** Annual grass weeds up to 12-inches tall. Perennial grass weeds: Application may be repeated as needed but not to exceed the specified annual application rate.

Use-specific Information

Alfalfa, Birdsfoot Trefoil, Sainfoin (dry and undried)

- PHI
 - Hay (dry): 14 days before cutting
 - Forage (undried): 7 days before grazing, feeding, or cutting
- Maximum Single Application Rate - Hay (dry) and Forage (undried): 2.5 pints/acre
- Maximum Annual Application Rate - Hay (dry) and Forage (undried): 6.5 pints/acre
- There are no livestock grazing or feeding restrictions in alfalfa, birdsfoot trefoil, or sainfoin.
- Aerial and ground application allowed.

Poast® herbicide may be applied to seedling or established alfalfa grown for hay, silage, green chop, direct grazing, or seed. Apply **Poast** before mowing for the best control of annual grass weeds. Mowed grass weeds may form large crowns and could require repeat applications for control.

NOTE: In alfalfa, the addition of ammonium sulfate (AMS) or urea ammonium nitrate (UAN) will enhance activity on certain grass weed species.

Irrigated Alfalfa, Birdsfoot Trefoil, and Sainfoin

- The timing of irrigation is important to achieve optimum grass weed control.
- **Poast** application 2 to 4 days after irrigation is most effective because:
 - Grass weeds have resumed active growth.
 - Grass weeds have less chance to grow too large.
 - Later applications allow plants to begin to canopy, which interferes with spray coverage.
- Irrigation shortly after application (e.g., 2 days) can be effective, but more consistent control is obtained when irrigation is made before application.

Annual Grass Weed Control

- Apply **Poast** at the rate and timing (maximum height) indicated in **Table 5** and **Table 7**.
- If grass weeds have been cut, apply after 2 to 4 inches of regrowth (so there will be enough leaf area for absorption) and before exceeding maximum height (refer to **Table 5** and **Table 7**).
- Apply before plant canopies cover annual grass weeds and interfere with spray coverage. NOTE: Timing applications to after a cutting following an irrigation or rainfall will allow grass weeds to regrow to a treatable size.
- Spray spring-germinating and summer-germinating grass weeds as early in the season as possible.
- Spray fall-germinating grass weeds in the fall soon after they begin growing but before any killing frost.

Perennial Grass Weed Control

- **Poast** effectively controls or suppresses perennial grass weeds listed in **Table 6**. However, a program of repeat applications will usually provide the best results.
- The most economical way of controlling perennial grass weeds is to disk the field before stand establishment to thoroughly fragment rhizomes or stolons.
- In summer and fall seedings, cool-season grass weeds (e.g., perennial ryegrass, quackgrass, wirestem muhly) can become competitive under cool fall conditions. Fall applications will reduce late-season growth and limit accumulation of nutrient reserves in roots and rhizomes.
- In established stands, apply in the spring when conditions favor active growth and before storage tissues have increased their nutrient reserves.
- Make additional applications on any grass regrowth in later cuttings.

Apricot (bearing)

- **PHI** 25 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- **DO NOT** allow livestock to graze or feed in treated apricot groves or orchards. **DO NOT** feed livestock anything from treated apricot groves or orchards.
- Ground application allowed. **DO NOT** apply by air.

Artichoke, Globe

- PHI 7 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field.
- Aerial and ground application allowed.

Asparagus

- PHI 1 day
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field.
- Aerial and ground application allowed.

Avocado

(nonbearing)

- PHI 1 year
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 7.5 pints/acre
- **DO NOT** allow livestock to graze or feed in treated avocado groves or orchards. **DO NOT** feed livestock anything from treated avocado groves or orchards.
- Ground application allowed. **DO NOT** apply by air.

To minimize potential for tree injury, direct spray away from leaves where possible.

Basil, Dried and Fresh

DO NOT use on basil in California.

- PHI 14 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- DO NOT allow livestock to graze or feed treated field.
- **DO NOT** feed livestock anything from treated field.
- Aerial and ground application allowed.

Beans, Dry and Succulent

• PHI

- Dry: 30 days
- Succulent: 15 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 4.0 pints/acre
 There are no livestock grazing or feeding restrictions in
- There are no investock grazing of reeding restrictions beans (dry or succulent).
- Aerial and ground application allowed.

To control crabgrass, shattercane, volunteer corn and all volunteer cereals, and witchgrass, add 2.5 pounds of AMS or 4.0 to 8.0 pints of UAN.

Beet, Garden/Table

- PHI 60 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field.
- Aerial and ground application allowed.

Beet, Sugar (see Sugar Beet)

Blueberry (highbush and lowbush) and other **Bushberries** (including aronia berry, buffalo currant, Chilean guava, highbush cranberry, black currant, red currant, elderberry, European barberry, gooseberry, edible honeysuckle, huckleberry, jostaberry, Juneberry (Saskatoon berry), lingonberry, native currant, salal, sea buckthorn)

DO NOT use on blueberry and other bushberries in California.

- **PHI** 1 day (highbush blueberry), 30 days (lowbush blueberry), 45 days (other bushberries)
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- **DO NOT** make more than 2 applications per year, allowing a minimum of 14 days between applications.
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field.
- Aerial and ground application allowed.

Borage

DO NOT use on borage in California.

- PHI 23 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field.
- Aerial and ground application allowed.

Brassica Vegetables

[including: Broccoli (including Chinese and Raab); Brussels Sprouts; Cabbage (Bok Choy, Chinese Mustard, Napa); Cauliflower; Collards; Kale; Kohlrabi; Mustard Greens; Rape Greens]

• PHI - 30 days

EXCEPTION: Mustard greens may be harvested after 14 days.

- Maximum Single Application Rate 1.5 pints/acre
- Maximum Annual Application Rate 3.0 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field.
- Aerial and ground application allowed.

Buckwheat

DO NOT use on buckwheat in California.

- PHI 21 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field.
- Aerial and ground application allowed.

Bulb Vegetables [including: Garlic; Leek; Onion (Dry Bulb and Green); Shallot]

- PHI 30 days
- Maximum Single Application Rate 1.5 pints/acre
- Maximum Annual Application Rate 4.5 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field.
- Aerial and ground application allowed.

Caneberries [All varieties and/or hybrids of these: Blackberry; Raspberry (Red and Black); Loganberry; Youngberry]

- PHI 45 days (broadcast application)
- PHI 1 day (banded application)
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field.
- Aerial and ground application allowed (broadcast application)

EXCEPTION: DO NOT apply by air in California.

• Apply banded application only by ground (not aerially).

Carrot

- PHI 30 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field.
- Aerial and ground application allowed.

Cherry, Sweet and Tart

(bearing and nonbearing)

- PHI 25 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- **DO NOT** allow livestock to graze or feed in treated cherry (sweet or tart) groves or orchards. **DO NOT** feed livestock anything from treated cherry (sweet or tart) groves or orchards.
- Ground application allowed. **DO NOT** apply by air.

Citrus

- PHI 15 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 10.0 pints/acre
- There are no livestock grazing or feeding restrictions in citrus. **NOTE:** Pulp and waste may be feed to livestock.
- Ground application allowed. **DO NOT** apply by air.

Clover

- PHI
 - Hay (dry): 20 days before grazing, feeding, or cutting
- Forage (undried): 7 days before grazing, feeding, or cutting
- Maximum Single Application Rate
- Hay (dry) and Forage (undried): 2.5 pints/acre
- Maximum Annual Application Rate - Hay (dry) and Forage (undried): 6.5 pints/acre
- There are no livestock grazing or feeding restrictions in clover.
- Aerial and ground application allowed.

Poast® herbicide may be applied to seedling or established clover grown for hay, silage, green chop, direct grazing, or seed. Apply **Poast** before mowing for the best control of annual grass weeds. Mowed grass weeds may form large crowns and could require repeat applications for control.

DO NOT tank mix with 2,4-DB when applying **Poast** to clover.

Irrigated Clover

- Irrigation can be critical to the success of **Poast** to start grass weeds growing again.
- **Poast** application 2 to 4 days after irrigation is most effective because:
 - Grass weeds have resumed active growth.
 - Grass weeds have less chance to grow too large.
 - Later applications allow plants to begin to canopy, which interferes with spray coverage.
- Irrigation shortly after application (e.g., 2 days) can be effective, but more consistent control is achieved when irrigation is made before application.

Annual Grass Weed Control

- Apply **Poast** at the rate and timing (maximum height) indicated in **Table 5** and **Table 7**.
- If grass weeds have been cut, apply after 2 to 4 inches of regrowth (so there will be enough leaf area for absorption) and before exceeding maximum height (refer to **Table 5** and **Table 7**).
- Apply before plant canopies cover grass weeds and interfere with spray coverage. **NOTE:** Timing applications to after a cutting following an irrigation or rainfall will allow grass weeds to regrow to treatable size.
- Spray spring-germinating and summer-germinating grass weeds as early in the season as possible.
- Spray fall-germinating grass weeds in the fall soon after they begin growing, but before any killing frost.

Perennial Grass Weed Control

- **Poast** effectively controls or suppresses perennial grass weeds listed in **Table 6**. However, a program of repeat applications will usually provide the best results.
- For the most economical perennial grass weed control, disk the field before stand establishment to thoroughly fragment rhizomes or stolons.
- In summer and fall seedings, cool-season grass weeds (e.g., perennial ryegrass, quackgrass, wirestem muhly) can become competitive under cool fall conditions. Fall applications will reduce late-season growth and limit accumulation of nutrient reserves in roots and rhizomes.
- In established stands, apply in the spring when conditions favor active growth and before storage tissues have increased their nutrient reserves.
- Make additional applications on any grass regrowth in the later cuttings.

Conservation Reserve Land

For this application, DO NOT use west of the Rocky Mountains.

- **PHI** There is no PHI when applying to **Conservation Reserve** land unless application is being made to alfalfa, birdsfoot trefoil, clover, or sainfoin.
 - Alfalfa, birdsfoot trefoil, or sainfoin PHI
 - Hay (dry): 14 days before cutting
 - Forage (undried): 7 days before grazing, feeding, or cutting

Clover cover crops PHI

- Hay (dry): 20 days before cutting
- Forage (undried): 7 days before grazing, feeding, or cutting
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 7.5 pints/acre EXCEPTION: If applying to alfalfa, birdsfoot trefoil, clover, or sainfoin, DO NOT apply more than a total of 6.5 pints/acre/year.
- **DO NOT** harvest or graze cover crops other than alfalfa, birdsfoot trefoil, clover, or sainfoin treated with **Poast® herbicide**. **DO NOT** feed livestock cover crops other than alfalfa, birdsfoot trefoil, clover, or sainfoin from treated Conservation Reserve Land.
- Aerial and ground application allowed.

Broadleaf Cover Crops. The growth of broadleaf cover crops (e.g., alfalfa, birdsfoot trefoil, clover, lespedeza, vetches) will not be affected by application of **Poast**.

Grass Cover Crops. Most seeded grass crops (e.g., bromegrasses, oats, orchardgrass, ryegrass, Sudangrass, tall fescue, or timothy) will be injured or killed by **Poast**. **DO NOT** apply **Poast** to these grass cover crops if injury is undesirable.

Corn, Field including Poast[®] Protected hybrids

DO NOT use on field corn in California.

- PHI
 - Grain and Fodder: 60 days
- Forage and Silage: 45 days
- Maximum Single Application Rate 1.5 pints/acre
- Maximum Annual Application Rate 3.0 pints/acre
- There are no livestock grazing or feeding restrictions in field corn.
- Aerial and ground application allowed.

Preplant Burndown Treatment

Apply **Poast** to actively growing grass weeds at 1.0 pint/ acre 30 days or more before planting corn. Use 2.0 to 4.0 pints of UAN **or** 1.0 to 2.0 pounds of AMS plus COC or MSO at 1.0 to 2.0 pints/acre.

Poast[®] Protected hybrids ONLY

Only Poast Protected field corn hybrids are tolerant to in-crop Poast application. DO NOT use on other field corn hybrids or severe crop injury will occur to field corn hybrids not designated as Poast Protected corn.

Over-the-top application (after corn emergence) of **Poast** in **Poast Protected** field corn may be made until onset of pollen shed if appropriate preharvest intervals are observed. **DO NOT** apply **Poast** after pollination.

To control crabgrass, shattercane, volunteer corn and all volunteer cereals, and witchgrass, add 2.5 pounds of AMS or 4.0 to 8.0 pints of UAN.

Corn, Sweet (Poast[®] Protected hybrids ONLY)

DO NOT use on sweet corn in California.

Only Poast Protected sweet corn hybrids are tolerant to Poast application. DO NOT use on other sweet corn hybrids or severe crop injury will occur to sweet corn hybrids not designated as Poast Protected corn.

• PHI

- Grain and Fodder: 45 days
- Forage, Silage, and Fresh Sweet Corn: 30 days
- Maximum Single Application Rate 1.5 pints/acre
- Maximum Annual Application Rate 3.0 pints/acre
- There are no livestock grazing or feeding restrictions in sweet corn.
- Aerial and ground application allowed.

To control crabgrass, shattercane, volunteer corn and all volunteer cereals, and witchgrass, add 2.5 pounds of AMS or 4.0 to 8.0 pints of UAN.

Application of **Poast** in **Poast Protected** sweet corn may be made until the onset of pollen shed. **DO NOT** apply **Poast** after pollination. A second application of **Poast** in **Poast Protected** sweet corn may be made 10 days or more after the first application.

Cotton

- **PHI** 40 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 7.5 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field. **EXCEPTION:** Processed meal may be fed to animals.
- Aerial and ground application allowed.

To control crabgrass, shattercane, volunteer corn and all volunteer cereals, and witchgrass, add 2.5 pounds of AMS or 4.0 to 8.0 pints of UAN.

Cranberry

DO NOT use on cranberry in California.

- PHI 60 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- DO NOT allow livestock to graze or feed treated bog or field. DO NOT feed livestock anything from treated bog or field.
- Aerial and ground application allowed.

Crops Grown for Seed

Poast® herbicide can be used on all crops listed in this label when they are grown for seed production. Use the rate indicated for the crop, as detailed in this **Use-specific Information** section. Slight modifications in application methods may be required for certain seed crops because of crop canopy or different cultural methods from the corresponding crop.

Cucurbit Vegetables [including: Cantaloupes (all); Cucumber; Gherkin; Honeydew Melon; Muskmelon (all); Pumpkin; Squash (all); Watermelon]

• PHI - 14 days

EXCEPTION: Cantaloupe and cucumber may be harvested after 3 days.

- Maximum Single Application Rate 1.5 pints/acre
- Maximum Annual Application Rate 3.0 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field.
- Aerial and ground application allowed.

Date

(nonbearing)

- PHI 1 year
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 7.5 pints/acre
- **DO NOT** allow livestock to graze or feed in treated date groves or orchards. **DO NOT** feed livestock anything from treated date groves or orchards.
- Ground application allowed. **DO NOT** apply by air.

To minimize potential for tree injury, direct spray away from leaves where possible.

Dill

DO NOT use on dill in California.

- PHI 14 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field.
- Aerial and ground application allowed.

- PHI 1 year
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 7.5 pints/acre
- **DO NOT** allow livestock to graze or feed in treated fig groves or orchards. **DO NOT** feed livestock anything from treated fig groves or orchards.
- Ground application allowed. **DO NOT** apply by air.

To minimize potential for tree injury, direct spray away from leaves where possible.

Fine Fescue Grown for Turfgrass Seed

- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- **DO NOT** apply more than 2 applications per year.
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed treated fescue screenings or hay to livestock.
- Ground application allowed. **DO NOT** apply by air.

Only apply **Poast** to fine fescue varieties classified as creeping red (*Festuca rubra*), Chewings (*Festuca nigrescens*), and hard fescue (*Festuca ovina*). Use standard high-pressure pesticide hollow cone or flat fan nozzles (minimum of 40 PSI at the nozzle); apply at least 10 gallons of water per acre. If foliage is dense, increase water volume to 20 gallons per acre (minimum of 60 PSI). Thorough foliar spray coverage is essential.

- **DO NOT** apply to tall fescue (*Schedonorus arundinaceus*) or any other desired grass plant. Injury will occur.
- **Poast** does **NOT** control annual bluegrass (*Poa annua*) or rattail fescue (*Vulpia myuros*).
- **DO NOT** apply if rainfall is expected within 1 hour of application.
- **DO NOT** use flood or whirl chamber nozzles or selective application equipment (e.g., recirculating sprayers, wiper applicators, shielded applicators).

For control of annual ryegrass, colonial and highland bentgrasses, cheatgrass/downy brome, and German velvetgrass, apply when fine fescue is semi-dormant (generally November 1 through March 15). Application at other times of the year can result in reduced control. Refer to **Table 9** for application rate and timing (maximum height) information.

Table 9. Application Rate and Timing(Maximum Height) - Fine Fescue Grown forTurfgrass Seed

•				
Turfgrass Species	Maximum Height* (inches)	Rate per Acre** (pints)		
Annual Turfgrass				
Annual ryegrass (Lolium multiflorum)	4 to 8	1.5		
Cheatgrass/Downy brome (Bromus tectorum)	2 to 6	2.5		
NOTE: Late fall applications, after maximum germination, produce the best results.				
Perennial Turfgrass				
German velvetgrass (Holcus mollis)	2 to 4	2.0 to 2.5		
Colonial bentgrass Highland bentgrass (Agrostis tenuis)	2 to 4	1.5 to 2.5		
NOTE: Use the higher rate on well-established grass weeds.				
* When fine fescue is semi-dormant				

" If regrowth occurs or new plants emerge, make a second application at the same rate.

Fine Fescue Grown for Turfgrass Seed in Idaho, Oregon, and Washington

- PHI 14 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- **DO NOT** apply more than 2 applications per year. Allow 30 days between applications.
- There are no livestock grazing or feeding restrictions in fine fescue grown for turfgrass seed.

NOTE: Treated fescue screenings or hay may be fed to animals.

• Ground application allowed. **DO NOT** apply by air.

Only apply **Poast® herbicide** to fine fescue varieties classified as creeping red (*Festuca rubra*), Chewings (*Festuca nigrescens*), and hard fescue (*Festuca ovina*). Use standard high-pressure pesticide hollow cone or flat fan nozzles (minimum of 40 PSI at the nozzle); apply at least 10 gallons of water per acre. If foliage is dense, increase water volume to 20 gallons per acre (minimum of 60 PSI). Thorough foliar spray coverage is essential.

- **DO NOT** apply to tall fescue (*Schedonorus arundinaceus*) or any other desired grass plant. Injury will occur.
- **Poast** does **NOT** control annual bluegrass (*Poa annua*) or rattail fescue (*Vulpia myuros*).
- **DO NOT** apply if rainfall is expected within 1 hour of application.

• **DO NOT** use flood or whirl chamber nozzles or selective application equipment (e.g., recirculating sprayers, wiper applicators, shielded applicators).

For control of annual ryegrass, colonial and highland bentgrasses, cheatgrass/downy brome, and German velvetgrass, apply when fine fescue is semi-dormant (generally November 1 through March 15). Application at other times of the year can result in reduced control. Refer to **Table 10** for application rate and timing (maximum height) information.

Table 10. Application Rate and Timing(Maximum Height) - Fine Fescue Grown forTurfgrass Seed

Turfgrass Species	Maximum Height* (inches)	Rate per Acre** (pints)		
Annual Turfgrass				
Annual ryegrass (Lolium multiflorum)	4 to 8	1.5		
Cheatgrass/Downy brome (Bromus tectorum)	2 to 6	2.5		
NOTE: Late fall applications, after maximum germination, produce the best results.				
Perennial Turfgrass				
German velvetgrass (Holcus mollis)	2 to 4	2.0 to 2.5		
Colonial bentgrass Highland bentgrass <i>(Agrostis tenuis)</i>	2 to 4	1.5 to 2.5		
NOTE: Use the higher rate on well-established grass weeds.				
* When fine fescue is semi-dormant ** If regrowth occurs or new plants emerge, make a sec-				

Flax

DO NOT use on flax in California.

- PHI 75 days
- Maximum Single Application Rate 1.5 pints/acre
- Maximum Annual Application Rate 4.0 pints/acre
- There are no livestock grazing or feeding restrictions in flax. **NOTE:** Processed meal may be fed to animals.
- Aerial and ground application allowed.

To control crabgrass, shattercane, volunteer corn and all volunteer cereals, and witchgrass, add 2.5 pounds of AMS or 4.0 to 8.0 pints of UAN.

Fruiting Vegetables (excluding Tomato) [including: Eggplant; Groundcherry; Pepino; Peppers (all); Tomatillo]

• PHI - 20 days

EXCEPTION: Peppers (all) may be harvested after 7 days.

- Maximum Single Application Rate 1.5 pints/acre
- Maximum Annual Application Rate 4.5 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field.
- Aerial and ground application allowed.

Grape

- PHI 50 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- **DO NOT** allow livestock to graze or feed treated vineyard. **DO NOT** feed livestock anything from treated vineyard. **EXCEPTION:** Pomace and raisin waste may be fed to animals.
- Ground application allowed. **DO NOT** apply by air.

Head-type and Petiole-type Vegetables [Cardoon, Celery; Celery (Chinese); Celtuce; Fennel (Florence); Lettuce (Head); Radicchio; Rhubarb; Swiss Chard]

• PHI - 30 days

EXCEPTION: In Florida, celery may be harvested after 14 days.

EXCEPTION: In Illinois, Indiana, Michigan, Minnesota, and Wisconsin, rhubarb may be harvested after 15 days.

- Maximum Single Application Rate 1.5 pints/acre
- Maximum Annual Application Rate 3.0 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field.
- Aerial and ground application allowed. **EXCEPTION: DO NOT** apply to rhubarb by air.

Horseradish

DO NOT use on horseradish in California.

- PHI 60 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field.
- Ground application allowed. **DO NOT** apply by air.

Leafy Vegetables

[Amaranth; Arugula; Chervil; Chrysanthemum (Edible and Garland); Cilantro; Corn Salad; Cress (Garden and Upland); Dandelion; Dock; Endive (Escarole); Lettuce (Leaf); Orach; Parsley; Purslane (Garden and Winter); Spinach (including New Zealand and Vine)]

- PHI 15 days
- Maximum Single Application Rate 1.5 pints/acre
- Maximum Annual Application Rate 3.0 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field.
- Aerial and ground application allowed.

Lentil

DO NOT use on lentil in California.

- PHI 50 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 4.0 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field.
- Aerial and ground application allowed.

To control crabgrass, shattercane, volunteer corn and all volunteer cereals, and witchgrass, add 2.5 pounds of AMS or 4.0 to 8.0 pints of UAN.

Mint

- **PHI** 20 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field.
- Aerial and ground application allowed.

To control crabgrass, shattercane, volunteer corn and all volunteer cereals, and witchgrass, add 2.5 pounds of AMS or 4.0 to 8.0 pints of UAN.

Nectarine (bearing)

- **PHI** 25 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- **DO NOT** allow livestock to graze or feed in treated nectarine groves or orchards. **DO NOT** feed livestock anything from treated nectarine groves or orchards.
- Ground application allowed. **DO NOT** apply by air.

Nonagricultural Land

DO NOT use on red sprangletop in Arizona, California, or western New Mexico.

- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 7.5 pints/acre
- **DO NOT** allow livestock to graze or feed treated nonagricultural land. **DO NOT** feed livestock anything from treated nonagricultural land.
- Ground application allowed. **DO NOT** apply by air.

Nonagricultural lands include private, public, and military lands as follows:

- Uncultivated nonagricultural areas (including sewage disposal areas and airport, highway, railroad, and utility rights-of ways, roadsides, and other paved areas)
- Uncultivated agricultural areas Noncrop producing (including farmyards, fuel and other storage areas, fence and hedge rows, nonirrigation ditchbanks, and barrier strips)
- Industrial sites Outdoor (including lumberyards, electrical transformer and pipeline pumping stations, storage areas, and tank farms)
- Natural areas (including wildlife management areas, wildlife openings, wildlife habitats, recreation areas, campgrounds, trailheads, and trails)
- Potting soil and topsoil.

NOTICE TO USER: Due to difference in plant species/ variety and application techniques, neither the manufacturer nor the seller has determined whether or not **Poast**[®] **herbicide** can be safely used on all species/varieties under all conditions. It is the responsibility of the applicator and grower to test and determine if **Poast** can be used safely on the species/variety to be treated under the conditions expected to be encountered at the time of application. Test in a small area first, before wide-scale use. Any adverse conditions/effects should be visible within 7 days of application.

Okra

DO NOT use on okra in California.

- PHI 14 days
- Maximum Single Application Rate 1.5 pints/acre
- Maximum Annual Application Rate 5.5 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field.
- Aerial and ground application allowed.

Olive

(nonbearing)

- PHI 1 year
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 7.5 pints/acre
- **DO NOT** allow livestock to graze or feed in treated olive groves or orchards. **DO NOT** feed livestock anything from treated olive groves or orchards.
- Ground application allowed. **DO NOT** apply by air.

To minimize potential for tree injury, direct spray away from leaves where possible.

Orchard Floor Middles (growth management)

- Not registered for use on orchard floor middles in the State of California.
- Maximum Single Application Rate 0.5 pint/acre
- Maximum Annual Application Rate 0.5 pint/acre
- **DO NOT** allow livestock to graze or feed in treated orchard floor middles. **DO NOT** feed livestock anything from treated orchard floor middles.
- Ground application allowed. **DO NOT** apply by air.

Tank Mixes with 2,4-D Dimethylamine

Use this tank mix to reduce the number of mechanical mowings in cool-season grasses and mixtures of Kentucky bluegrass, perennial ryegrass, and tall fescue found in orchard floor middles.

NOTE: Some discoloration of turfgrass may occur; however, treatment effects will wear off with regrowth and greenup.

- Make **ONE** of the following applications per season:
- Apply this tank mix during the spring or summer when growth management is desired. **DO NOT** apply during bloom or less than 3 days after mowing.
- Optimally, apply after turfgrass greenup in the spring (before any mowing) or 3 days after the first mowing of the season. **NOTE:** This treatment will provide 5 to 8 weeks of growth management depending on turfgrass makeup (i.e., grass species, broadleaf weed pressure), environmental conditions, and desired maintenance height of orchard floor middles.

Tank Mix Specific Restrictions

- **DO NOT** make more than 1 application per year.
- **DO NOT** apply if rainfall or irrigation is expected within 6 hours of application.
- **DO NOT** apply to turfgrass less than 2 years old.
- **DO NOT** apply to newly established orchards. Trees must be at least 1 year old and in vigorous condition.

Peach

(bearing)

- PHI 25 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- **DO NOT** allow livestock to graze or feed in treated peach groves or orchards. **DO NOT** feed livestock anything from treated peach groves or orchards.
- Ground application allowed. **DO NOT** apply by air.

Peanut

- PHI 40 days
- Maximum Single Application Rate 1.5 pints/acre
- Maximum Annual Application Rate 2.5 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **EXCEPTION:** Processed meal may be fed to animals.
- Aerial and ground application allowed.

To control crabgrass, shattercane, volunteer corn and all volunteer cereals, and witchgrass, add 2.5 pounds of AMS or 4.0 to 8.0 pints of UAN.

Peas, Dry and Succulent

- PHI
 - Dry: 30 days
 - Succulent: 15 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 4.0 pints/acre
- There are no livestock grazing or feeding restrictions in peas.
- Aerial and ground application allowed.

To control crabgrass, shattercane, volunteer corn and all volunteer cereals, and witchgrass, add 2.5 pounds of AMS or 4.0 to 8.0 pints of UAN.

Pistachio

- PHI 15 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 10.0 pints/acre
- **DO NOT** allow livestock to graze or feed in treated pistachio groves or orchards. **DO NOT** feed livestock anything from treated pistachio groves or orchards.
- Ground application allowed. **DO NOT** apply by air.

For bearing pistachio trees, only apply as a directed spray to the grove floor.

Plum

(nonbearing)

- PHI 1 year
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 7.5 pints/acre
- **DO NOT** allow livestock to graze or feed in treated plum groves or orchards. **DO NOT** feed livestock anything from treated plum groves or orchards.
- Ground application allowed. **DO NOT** apply by air.

To minimize potential for tree injury, direct spray away from leaves where possible.

Pome Fruits [including: Apple, Crabapple, Pear, Quince]

- PHI 14 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 7.5 pints/acre
- **DO NOT** allow livestock to graze or feed treated grove or orchard. **DO NOT** feed livestock anything from treated pome fruit groves or orchards. **EXCEPTION:** Pressed or processed apple waste may be fed to animals.
- Ground application allowed. **DO NOT** apply by air.

Pomegranate (nonbearing)

- PHI 1 year
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 7.5 pints/acre
- DO NOT allow livestock to graze or feed in treated pomegranate groves or orchards. DO NOT feed livestock anything from treated pomegranate groves or orchards.
- Aerial and ground application allowed.

To minimize potential for tree injury, direct spray away from leaves where possible.

Potato, Field (excluding sweet potato)

- PHI 30 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field. **EXCEPTION:** Potato wastes may be fed to animals.
- Aerial and ground application allowed.

NOTE: For heavy infestations of quackgrass in potato, apply 2.5 pints of **Poast[®] herbicide** per acre followed by a sequential application of 1.5 pints, if needed.

Tank Mix Specific Restrictions with Metribuzin-containing Products

- In California, **DO NOT** tank mix **Poast**[®] **herbicide** with metribuzin-containing products for application to potato.
- Only apply to non-early maturing russetted or whiteskinned varieties of potato.
- **PHI** 60 days, if tank mixed with metribuzin-containing products
- **DO NOT** apply unless there have been 3 prior successive days of sunny weather, or crop injury may occur.
- DO NOT add AMS or UAN.
- **DO NOT** use on: Bermudagrass, itchgrass, quackgrass, red rice, rhizome Johnsongrass, shattercane, volunteer cereal or corn, or wirestem muhly.

Potato, Sweet (excluding sweet potato)

Eastern U.S. (Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas, and Virginia)

- PHI 30 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- DO NOT allow livestock to graze or feed treated field. DO NOT feed livestock anything from treated field.
- Aerial and ground application allowed.

Western U.S. (Arizona, California, Hawaii, Idaho, Nevada, Oregon, and Washington)

- PHI 60 days
- Maximum Single Application Rate 1.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field.
- Aerial and ground application allowed.

DO NOT apply a tank mix of **Poast** and metribuzin to sweet potato (or yams).

Prune

(nonbearing)

- PHI 1 year
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 7.5 pints/acre
- **DO NOT** allow livestock to graze or feed in treated prune groves or orchards. **DO NOT** feed livestock anything from treated prune groves or orchards.
- Ground application allowed. **DO NOT** apply by air.

To minimize potential for tree injury, direct spray away from leaves where possible.

Rapeseed Subgroup (excluding borage and flax) [including: Crambe; Cuphea; Echium; Gold of pleasure (Camelina); Hare's ear mustard; Lesquerella; Lunaria; Meadowfoam; Milkweed; Mustard seed; Oil radish; Poppy; Rapeseed (Canola); Sesame; Sweet rocket]

DO NOT use on listed crops in the Rapeseed Subgroup in California.

- **PHI** 60 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field. **EXCEPTION:** Processed meal may be feed to animals.
- Aerial and ground application allowed.

To control crabgrass, shattercane, volunteer corn and all volunteer cereals, and witchgrass, add 2.5 pounds of AMS or 4.0 to 8.0 pints of UAN.

Root Vegetables Subgroup (excluding sugar beet)

[including: Edible burdock; Celeriac; Chervil, turnip-rooted; Chicory; Ginseng; Oriental radish; Parsley, turnip-rooted; Parsnip; Radish; Rutabaga; Salsify; Black salsify; Spanish salsify; Skirret; Turnip]

DO NOT use on root vegetables in California.

- PHI 14 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 2.5 pints/acre
- **DO NOT** allow Annual to graze or feed treated field. **DO NOT** feed livestock anything from treated field.
- Aerial and ground application allowed.

Safflower

DO NOT use on safflower in California.

- PHI 30 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field.
- Aerial and ground application allowed.

Soybean

NOTE: In California, the maximum application rate is 2.0 pints per acre.

- PHI 75 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- Only processed meal from seed and hay may be grazed or fed to livestock.
- Aerial and ground application allowed.

To control crabgrass, shattercane, volunteer corn and all volunteer cereals, and witchgrass, add 2.5 pounds of AMS or 4.0 to 8.0 pints of UAN.

Strawberry

- PHI 7 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 2.5 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field.
- Aerial and ground application allowed. **EXCEPTION: DO NOT** apply by air in California.

Sugar Beet

- PHI 60 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- There are no livestock grazing or feeding restrictions in sugar beet. **NOTE:** Processed pulp and molasses may be fed to livestock.
- Aerial and ground application allowed.

To control crabgrass, shattercane, volunteer corn and all volunteer cereals, and witchgrass, add 2.5 pounds of AMS or 4.0 to 8.0 pints of UAN.

Sunflower

- PHI 70 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 2.5 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field. **EXCEPTION:** Processed meal and soapstock may be fed to livestock.
- Aerial and ground application allowed.

To control crabgrass, shattercane, volunteer corn and all volunteer cereals, and witchgrass, add 2.5 pounds of AMS or 4.0 to 8.0 pints of UAN.

Commercially released varieties of sunflower are tolerant to **Poast® herbicide** at all stages of growth. **DO NOT** use **Poast** on sunflower inbred lines grown for seed. **NOTE:** Leaf speckling occasionally has been observed with no corresponding reduction in vigor or growth.

Tall Fescue Growth Suppression (in Nonagricultural Land)

Tall fescue must be 1-year old before the first application.

- Not registered for use on tall fescue for growth suppression in the State of California.
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 7.5 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field.
- Aerial and ground application allowed.

Apply 1.0 to 1.25 pints per acre of **Poast** to actively growing tall fescue:

- After it has 4 to 6 inches of new growth
- Before the emergence of seedheads

For optimum control, **DO NOT** mow tall fescue for 30 days before or 14 days after treatment. For greater suppression, apply up to 2.5 pints per acre. **NOTE:** Because of environmental differences at the time of application, and the growth differences of tall fescue, control may exceed or fall short of that desired (e.g., applications made July 1 to mid-August may be less effective, especially if day temperatures reach 90° F).

Tobacco

DO NOT use on tobacco in California.

- PHI 42 days
- Maximum Single Application Rate 1.5 pints/acre
- Maximum Annual Application Rate 4.0 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field.
- Aerial and ground application allowed.

To control crabgrass, shattercane, volunteer corn and all volunteer cereals, and witchgrass, add 2.5 pounds of AMS or 4.0 to 8.0 pints of UAN.

Sequential Application

- **Application 1** Apply to plantbed seedlings up to 4 weeks before transplanting to the field.
 - Maximum application rate 1.0 pint/acre
- Application 2 Apply up to 3 weeks after transplanting. - Maximum application rate - 1.5 pints/acre
- Application 3 Apply up to 7 weeks after transplanting. - Maximum application rate - 1.5 pints/acre

NOTE: Poast may be applied at the seedbed stage of growth.

Tomato

- PHI 20 days
- Maximum Single Application Rate 1.5 pints/acre
- Maximum Annual Application Rate 4.5 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field. **EXCEPTION:** Tomato waste may be fed to livestock.
- Aerial and ground application allowed.

Tank Mix Specific Restrictions with Metribuzin-containing Products

- In California, **DO NOT** tank mix **Poast**[®] **herbicide** with metribuzin-containing products for application to tomato.
- DO NOT add AMS or UAN.
- **DO NOT** use on: Bermudagrass, itchgrass, quackgrass, red rice, rhizome Johnsongrass, shattercane, volunteer cereal or corn, or wirestem muhly.
- **DO NOT** treat transplanted tomatoes within 14 days of transplanting. Tomatoes must have recovered from transplant shock and new growth must be evident.
- **DO NOT** treat seeded tomatoes until plants have reached the 5 to 6 leaf stage.

Tree Nuts

Poast may be used in bearing and nonbearing tree nuts.

- PHI 15 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 10.0 pints/acre
- **DO NOT** allow livestock to graze or feed treated grove or orchard. **DO NOT** feed livestock anything from treated tree nut groves or orchards. **EXCEPTION:** In almond, only almond hulls may be fed to animals.
- Ground application allowed. **DO NOT** apply by air.

Tree nuts are very tolerant to **Poast**; application may be made over the top of small, nonbearing trees or as a directed spray on larger trees.

Tuberous and Corm Vegetables [Arracacha; Arrowroot; Artichoke (Chinese and Jerusalem); Canna (Edible); Cassava (Bitter and Sweet); Chayote Root; Chufa; Dasheen (Taro); Ginger; Leren; Potato, Tanier; Turmeric; Yam Bean; Yam (True)]

- **PHI** 30 days
- Maximum Single Application Rate 2.5 pints/acre
- Maximum Annual Application Rate 5.0 pints/acre
- **DO NOT** allow livestock to graze or feed treated field. **DO NOT** feed livestock anything from treated field.
- Aerial and ground application allowed.

Wildlife Food Plots

Poast can be used on all crops listed in this label for the purpose of establishing and maintaining wildlife food plots. Use the rate indicated for the crop and follow all associated restrictions and limitations, as detailed in this **Use-specific Information** section.

Conditions of Sale and Warranty

The **Directions For Use** of this product reflect the opinion of experts based on field use and tests. The directions are believed to be reliable and must be followed carefully. However, it is impossible to eliminate all risks inherently associated with the use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or use of the product in a manner inconsistent with its labeling, all of which are beyond the control of BASF CORPORATION ("BASF") or the Seller. To the extent consistent with applicable law, all such risks shall be assumed by the Buyer.

BASF warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes referred to in the **Directions For Use**, subject to the inherent risks, referred to above.

TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, BASF MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF FITNESS OR MERCHANTABILITY OR ANY OTHER EXPRESS OR IMPLIED WARRANTY.

TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, BUYER'S EXCLUSIVE REMEDY AND BASF'S EXCLUSIVE LIABILITY, WHETHER IN CONTRACT, TORT, NEGLIGENCE, STRICT LIABILITY, OR OTHERWISE, SHALL BE LIMITED TO REPAYMENT OF THE PURCHASE PRICE OF THE PRODUCT.

TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, BASF AND THE SELLER DISCLAIM ANY LIABILITY FOR CONSEQUENTIAL, EXEMPLARY, SPECIAL OR INDIRECT DAMAGES RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT.

BASF and the Seller offer this product, and the Buyer and User accept it, subject to the foregoing **Conditions of Sale and Warranty** which may be varied only by agreement in writing signed by a duly authorized representative of BASF. 1108

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007969-00058.20190417c.**NVA 2019-04-025-0075** Based on: NVA 2019-04-025-0074 Supersedes: NVA 2017-04-025-0052

> BASF Corporation 26 Davis Drive Research Triangle Park, NC 27709



We create chemistry



Postemergence Grass Herbicide

Intended for residential use on and around:

FlowersFruits*EvergreensVegetables*ShrubsOrnamental GroundcoversTreesBedding Plants

- * See Table 2. Fruits and Vegetables for specific crops.
- Systemic selective herbicide kills weedy grasses without injuring desirable plants.
- Controls: Bermudagrass, crabgrass, foxtail, quackgrass, and many other weedy grasses.
- Concentrate makes 8 gallons of spray solution.

Active Ingredient:

sethoxydim: 2-[1-(ethoxyimino)butyl]-5-[2-(ethylthio)propyl]-3-hydroxy-2-cyclohexen-1-one**	18.0%
Other Ingredients:	82.0%
Total:	100.0%
* Equivalent to 1.5 pounds of sethoxydim per gallon formulated as an emulsifiable concentrate	
Contains petroleum distillate	

EPA Reg. No. 7969-58

EPA Est. No.

KEEP OUT OF REACH OF CHILDREN WARNING/AVISO

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

See full label for complete First Aid, Precautionary Statements, Directions For Use, Conditions of Sale and Warranty, and state-specific crop and/or use site restrictions.

In case of an emergency endangering life or property involving this product, call day or night 1-800-832-HELP (4357).

Net Contents:



FIRST AID		
If in eyes	 Hold eyes open and rinse slowly and gently with water for 15 to 20 minutes. Remove contact lenses, if present, after the first 5 minutes; then continue rinsing eyes. Call a poison control center or doctor for treatment advice. 	
If on skin or clothing	Take off contaminated clothing.Rinse skin immediately with plenty of water for 15 to 20 minutes.Call a poison control center or doctor for treatment advice.	
If swallowed	 Call a poison control center or doctor immediately for treatment advice. DO NOT give any liquid to the person. DO NOT induce vomiting unless told to do so by a poison control center or doctor. DO NOT give anything by mouth to an unconscious person. 	
 Move person to fresh air. If person is not breathing, call 911 or an ambulance; then give artificial respiration, preferably by mouth to mouth, if possible. Call a poison control center or doctor for further treatment advice. 		
HOTLINE NUMBER		

Have the product container or label with you when calling a poison control center or doctor or going for treatment. You may also contact BASF Corporation for emergency medical treatment information: 1-800-832-HELP (4357).

NOTE TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage. Contains petroleum distillate. Vomiting may cause aspiration pneumonia.

Precautionary Statements

Hazards to Humans and Domestic Animals

WARNING. Causes substantial but temporary eye injury. Causes skin irritation. Harmful if absorbed through skin or swallowed. **DO NOT** get in eyes, on skin, or on clothing. Wear long-sleeved shirt, long pants, chemical-resistant gloves made of any waterproof material, protective eyewear, shoes, and socks. Wash hands thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco, or using the toilet. Remove and wash contaminated clothing before reuse.

Re-entry Statement

DO NOT allow people or pets to come into contact with treated areas until spray has dried.

Environmental Hazards

This product is toxic to aquatic organisms. To protect the environment, **DO NOT** allow pesticide to enter or run off into storm drains, drainage ditches, gutters, or surface waters. Applying this product in calm weather when rain is not predicted for the next 24 hours will help to ensure that wind or rain does not blow or wash pesticide off the treatment area. Rinsing application equipment over the treated area will help avoid run off to water bodies or drainage systems.

Nontarget Organism Advisory: This product is toxic to plants and may adversely impact the forage and habitat of nontarget organisms, including pollinators, in areas adjacent to the treated site. Protect the forage and habitat of nontarget organisms by following label directions intended to minimize spray drift.

Endangered Species Concerns

The use of any pesticide in a manner that may kill or otherwise harm an endangered or threatened species or adversely modify their habitat is a violation of federal law.

Physical and Chemical Hazards

COMBUSTIBLE. DO NOT use or store near heat or open flame.

Directions For Use

It is a violation of federal law to use this product in a manner inconsistent with this labeling.

READ ENTIRE LABEL BEFORE USING THIS PRODUCT.

Poast® herbicide is a selective systemic grass killer to eliminate existing weedy grasses growing in and around plant beds, landscapes, and individual shrubs and trees (see **Tolerant Plants**). **Poast** can be used through a hose-end sprayer according to the directions of the sprayer used or through a tank-type sprayer.

Poast can also be used around listed fruit and vegetable areas (see **Table 2**) wherever listed weedy grasses occur. Use only tank-type sprayers.

Weedy Grasses Controlled

Poast® herbicide kills most annual and hard-to-kill perennial grasses up to 1-foot high, including the following examples, in one or two applications. Younger, actively growing seedling weeds are more easily killed than older, mature, well-established grassy weeds that may require a repeat application for control. Adding oil concentrate may help control grassy weeds.

Barnyardgrass	Junglerice
Bermudagrass	Lovegrass
Broadleaf signalgrass	Orchardgrass, seedling
Crabgrass, large	Quackgrass
Crabgrass, smooth	Tall fescue seedling
Fall panicum	Texas panicum
Foxtail, giant	Shattercane/Wildcane
Foxtail, green	Wild proso millet
Foxtail, yellow	Wirestem muhly
Goosegrass	Witchgrass
Johnsongrass, seedling	Woolly cupgrass
Johnsongrass, rhizome	

NOTE: This product does not control sedge (including nutsedge or nutgrass), annual bluegrass, or broadleaf weeds. Red fescue, chewings fescue, hard fescue, and dichondra turfs are also tolerant to **Poast**.

Application Timing

Apply when grassy weeds are actively growing, not exceeding the minimum of days from application to harvest when used on vegetables and fruits. Warm sunny weather will accelerate systemic movement from leaves and stems down to the roots to give complete kill. **DO NOT** mow or cut off tops of weeds before spraying. **DO NOT** apply if rainfall is expected within one hour following application. Growth of treated grass stops soon after application. Grass turns yellow and dies within one to three weeks depending on the grass species, stage of growth and weather conditions. Cool weather, drought, and heat stress slow activity.

Table 1. Poast (concentrate) and Oil ConcentrateDilution

Water (gals)	Poast (fl ozs) or (tbsps)		Conce (fl ozs) o	ntrate* r (tbsps)	Coverage (sq ft)
1	1	2	1	2	1,800
3	3	6	3	6	5,400
5	5	10	5	10	9,000
8	8	16	8	16	14,400

One gallon of spray will treat 1800 square feet.

* To prevent leaf burn of desirable plants, **DO NOT** use oil concentrate when comfort index (temperature ° F + humidity) exceeds 150.

Hose-end Sprayer Application

Water Dilution/Premixing Not Needed

Determine the area to treat in square feet. Pour 1 fluid ounce **Poast** and 1 fluid ounce oil concentrate in the

hose-end sprayer bottle for each 1800 square feet treated. Apply 1 fluid ounce per gallon. After application, wash the sprayer with a dilute soap solution and rinse according to the sprayer instructions. Take precautions to minimize spray drift.

Water Dilution/Premixing Needed

Some hose-end applicators recommend premixing liquid products with water before pouring into the sprayer bottle. Read the hose-end sprayer instructions for treatments at 1 fluid ounce per 1800 square feet. Clean the sprayer after use according to the sprayer instructions.

Tank Sprayer Application

Mix 1 fluid ounce **Poast** plus 1 fluid ounce oil concentrate per 1 gallon water; spray to just wet the unwanted weedy grasses. One gallon of spray will treat 1800 square feet. Wash sprayer by flushing soapy water through the sprayer; then flushing clean water through the sprayer.

IMPORTANT: For spot treating grassy weeds near lawns and around sensitive plants, a tank-type sprayer is recommended. Spray carefully to avoid spray or drift contact with desirable plants. Setting nozzles at the lowest effective height will help to reduce the potential for spray drift. If drift occurs, wash foliage immediately with water.

Flowers, Bedding Plants, Evergreens, Shrubs, Trees and Ornamental Groundcovers

Poast may be applied over the top of desirable plants infested by weedy grasses, or as a directed spray to weedy grasses at labeled rate. **DO NOT** exceed dosage rate per gallon of spray. Most ornamental species tested have been found tolerant to **Poast** (see **Tolerant Plants** list). However, use with caution around the following plants as they may be damaged if spray contacts foliage: azaleas (var. snow), Japanese privet, potentilla, snow in summer, red oak, white oak, and ornamental grass.

Poast may also be used on the following nonbearing food plants. **DO NOT** apply within 1 year of harvest.

Avocados	Plums
Dates	Pomegranates
Figs	Prunes
Olives	

Fruits and Vegetables (use only with tank-type sprayers)

Use **Poast** on the fruits and vegetables listed in **Table 2. Fruits and Vegetables**. **DO NOT** apply on or around any fruits and vegetables not listed on this label, especially sweet corn. Apply on and around tolerant fruits and vegetables with a tank-type sprayer only. A second application may be made to all listed fruits and vegetables except peanut, root vegetables, and strawberry.

The quantities presented in Table 1. Poast (concentrate) and Oil Concentrate Dilution do not exceed the

STORAGE AND DISPOSAL

Pesticide Storage

DO NOT allow this product to freeze. **DO NOT** store below 32° F or above 100° F. Store unused product in original container only, out of reach of children and animals. **NEVER TRANSFER THIS PRODUCT TO ANOTHER CONTAINER FOR STORAGE.**

Pesticide Disposal

To avoid pesticide waste, use all material in this container by application according to label directions. If pesticide waste cannot be avoided, offer remaining product to a waste disposal facility or pesticide disposal program (often such programs are run by state or local governments or by industry).

Container Handling

Nonrefillable Container. DO NOT reuse or refill this container. Triple rinse or pressure rinse container (or equivalent) promptly after emptying; then offer for recycling, if available, or reconditioning, if appropriate, or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures approved by state and local authorities.

Triple rinse containers small enough to shake (capacity ≤ 5 gallons) as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank, or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times.

Triple rinse containers too large to shake (capacity > 5 gallons) as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank, or store rinsate for later use or disposal. Repeat this procedure two more times.

Pressure rinse as follows: Empty the remaining contents into application equipment or mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank, or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container and rinse at about 40 PSI for at least 30 seconds. Drain for 10 seconds after the flow begins to drip. **NOTE:** Buyer assumes all liability, including personal injury and property damage which may result from the use of this product in a manner inconsistent with labeling directions. If these terms are not acceptable, return at once unopened.

Table 2. Fruits and Vegetables

Сгор	Minimum time from last application to harvest (days)
Apple	14
Apricot	25
Artichoke (California only)	7
Asparagus	1
Beans, dry	30
Beans, green	15
Beet (garden)	60
Blackberry	45
Blueberry ¹	30
Broccoli	30
Cabbage	30
Cantaloupe	14
Carrots	30
Cauliflower	30
Celery	30
Cherries (sweet and sour)	25
Citrus	15
Crabapple	14
Cranberries ¹	60
Cucumber	14
Dill ¹	14
Eggplant	20
Endive (Florida only)	15
Grape	50
Horseradish	60
Lentils ¹	50
Lettuce, head	30
Lettuce, leaf	15
Loganberry	45
Mint	20
Muskmelon	14
Nectarine	25
Okra ¹	14
Onion, garlic	30
Peach	25

Table 2. Fruits and Vegetables (continued)

Crop	Minimum time from last application to harvest (days)
Peanut ²	40
Pear	14
Peas, dry	30
Peas, green	15
Pepper	20
Potato	30
Pumpkin	14
Quince	14
Raspberry	45
Root Vegetables ^{1,2} (except sugar beet) Black salsify Celeriac Chervil, turnip-rooted Chicory Edible burdock Ginseng Oriental radish Parsley, turnip-rooted Parsnip Radish Rutabaga Salsify Skirret Spanish salsify Turnip	14
Spinach	15
Squash (all)	14
Strawberry ²	7
Tomato	20
Tree nuts	15
Watermelon	14

¹ Not for use in California.

² Use no more than 1 application per season. Up to 2 applications per season may be made on all other plants.

Tolerant Plants

Common Name (Scientific Name)

Trees

Acacia, knife leaf (Acacia cultriformis) Arborvitae, Eastern (var. Teehny) (Thuja occidentalis) Arborvitae, Berkman's, Oriental (Thuja orientalis) (Platycladus orientalis) Ash, green (Fraxinus pennsylvanicum) Ash, mountain (Sorbus aucuparia) Ash, mountain (Sorbus americana decora) Ash, white (Fraxinus americana) Basswood, American (Tilia americana) Berkman's, Oriental (Thuja orientalis) Birch (Betula sp.) Birch, Asian white (var. Japonica) (Betula platyphylla) Birch, European white (Betula pendula) Birch, paper (Betula papyrifera) Birch, river, black or red (Betula nigra) Black locust (Robinia pseudoacacia) Bottle-brush (Callistemon lanceolatus) (Callistemon citrinus) Bottle tree (Brachychiton populneus) Brisbane box tree (Tristania conferta) Cajeput tree (Melaleuca quinquenervia) Carob tree (Ceratonia siliqua) Carrot wood (Cupaniopsis anacardioides) Catalpa, Southern (Catalpa bignonioides) Cherry, black (Prunus serotina)

Common Name (Scientific Name)

Trees (continued)

Cherry, Carolina (Prunus caroliniana 'compacta') Crabapple, flowering (var. Dalgo, Radiant, Red splendor, Royalty, Vanguard, Sylvestris, Domestic) (Malus sp.) Cypress, false (Chamaecyparis pisifera) Cypress, Italian (Cupressus sempervirens) Cypress, leyland (Cupressocyparis leylandii) Dogwood, flowering (Cornus florida) Dogwood, pagoda (Cornus alternifolia) Dogwood, silky (Cornus amomum) Elm, Chinese evergreen (Ulmus parvifolia) Eucalyptus (Eucalyptus robusta, E. lehmannii, E. nicholii, E. grandis) Fir (Abies sp.) Fir, Douglas (Pseudotsuga menziesii) Fir, Frasier (Abies fraseri) Fir. white (Abies concolor) Goldenrain tree (Koelreuteria paniculata) Guava (Psidium littorale) Guava, pineapple (Feijoa sellowiana) Gum. blue (Eucalyptus globulus) Gum. lemon-scented (Corymbia citriodora) (Eucalyptus citriodora) Gum. red box (Eucalyptus polyanthemos) Hackberry, common (Celtis occidentalis) Hemlock, Canadian (Tsuga canadensis) Hollv. Chinese (var. Bufordii, Rotunda) (llex cornuta)

Common Name (Scientific Name)

Trees (continued)

Holly, hybrid (var. Nellie Stevens) (llex spares) Holly, Japanese (var. convexa, compacta, helleri, hoogendorn) (llex crenata) Holly, yaupon (llex vomitoria) Ironbark, red (Eucalyptus sideroxylon) Jacaranda (Jacaranda mimosifolia) Kentucky coffee tree (Gymnocladus dioicus) Larch, European (Larix europa) Laurel, Indian (Ficus microcarpa nitida) Linden (Tilia americana) Linden, littleleaf (Tilia cordata) Locust, honey (Gleditsia triacanthos inermis) Loguat (Eriobotrya japonica) Magnolia, Southern (Magnolia grandiflora) Maple, Japanese (Acer palmatum) Maple, red (Acer rubrum) Maple, silver (Acer saccharinum) Mimosa tree (silktree) (Albizia julibrissin) **Mvoporum** (Myoporum laetum) New Zealand Christmas tree (Metrosideros excelsus) Oak (Quercus sp.) Oak, water (Quercus nigra) Oak, willow (Quercus phellos) Olive tree (Olea europaea)

Common Name (Scientific Name)

Trees (continued)

Olive, Russian (Elaeagnus angustifolia) Orchid tree, purple (Bauhinia variegata) Osage orange (Maclura pomifera) Palm, Mediterranean fan (Chamaerops humilis) Palm, pygmy date (Phoenix roebelenii) Palm, queen (Arecastrum romanzoffianum) Palm, sago (Cycas revoluta) Palm, windmill (Tracheocarpus fortunei) Palo verde, green (Parkinsonia aculeata) Paulownia royal (Paulownia tomentosa) Pear, common (Pyrus communis) Pear, evergreen (Pyrus kawakamii) Pear, Ussurian (Pyrus ussuriensis) Pepper, Brazilian (Schinus terebinthifolius) Pine, Aleppo (Pinus halepensis) Pine, Austrian (Pinus nigra) Pine, Canary Island (Pinus canariensis) Pine, Caribbean slash (Pinus caribaea) Pine, Italian stone (Pinus pinea) Pine, jack (Pinus banksiana) Pine, Japanese (Pinus parviflora) Pine, Japanese black (Pinus thunbergii) Pine, loblolly (Pinus taeda) Pine, Mugo (Pinus mugo)

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Common Name (Scientific Name)

Trees (continued)

Pine, ponderosa (Pinus ponderosa) Pine, red (Pinus resinosa) Pine, Scotch (Pinus sylvestris) Pine, shore (Pinus contra) Pine, slash (Pinus elliottii) Pine, Southern (Pinus palustris) Pine, Virginia (Pinus virginiana) Pine, Western yellow (Pinus ponderosa) Pine, white (Pinus parviflora) Pine, white (Pinus strobus) Pine, yew (Podocarpus macrophyllus) Plum, wild (Prunus americana) Poplar, hybrid (Populus alba) Popular, tuliptree (Liriodendron tulipifera) Popular, yellow (Liriodendron tulipifera) Purpleleaf, Bailey acacia (Acacia baileyana) Redwood, coast (Sequoia sempervirens) Sandcherry, Western (Prunus bessevi) Sensitive plant (Mimosa pudica) Silktree (Albizia julibrissin) Spruce, Black Hills (var. Densata) (Picea glauca) Spruce, Colorado blue (Picea pungens) Spruce, Norway (Picea abies) Spruce, white (Picea glauca)

Common Name (Scientific Name)

Trees (continued)

Strawberry tree (Arbutus unedo) Sumac, African (Rhus lancea) Sumac, standard (Rhus lancea) Sweetgum (Liquidambar stryaciflua) Sycamore (Platanus occidentalis) Teatree, Australian (Leptospermum laevigatum) Tipu tree (Tipuana tipu) Walnut, black (Juglans nigra) Weeping fig, exotica (Ficus benjamina) Willow (Salix matsudana tortuosa) Willow, Australian (Geijera parviflora) Willow, desert (Pittosporum phillyreoides) Willow, peppermint (Agonis flexuosa) Yate, bushy (Eucalyptus lehmannii) Yew, English (Taxus baccata)

Shrubs

Abelia, glossy (Abelia grandiflora) Acacia, Bailey (Acacia baileyana) Acacia, knife leaf (Acacia cultriformis) Acacia, prostrate (Acacia redolens) Acacia, Sydney golden wattle (Acacia longifolia) Andromeda (Pieris japonica) Arborvitae, Oriental (Platycladus orientalis) Arrowwood, Southern (Viburnum dentatum)

Common Name (Scientific Name)

Shrubs (continued)

Azalea, mollis hybrid (R. x kosterianum) Azalea, Northern lights hybrid (R. x kosterianum x R. prinophyllum) Bamboo, heavenly (Nandina domestica) Barberry, Japanese (Berberis thunbergii) Barberry, Korean (Berberis koreana) Barberry, redleaf (Berberis virginiana) Bird of paradise bush (Caesalpinia gilliesii) Bluebeard (Caryopteris clandonensis) Boxwood, African (Myrsine africana) Boxwood, common (Buxus sempervirens) Boxwood, Japanese (var. Japonica) (Buxus microphylla) Buckthorn, alder (Rhamnus frangula) Buckthorn, glossy (Rhamnus frangula) Camellia (Camellia japonica) (Camellia sasanqua) Cedar (Juniperus virginiana) Cedar. Eastern red (var. Pyramidiformus, caneartl) Cherry, brush (Eugenia myrtifolia) Cherry, Manchu (Prunus tomentosa) Cherry, Nanking (Prunus tomentosa) Chokecherry sp. (Aronia meloelata) Copper plant, Caribbean (Euphorbia cotinifolia) Cotoneaster, bearberry (Cotoneaster dammerii) Cotoneaster, cranberry (Cotoneaster apiculata) Cotoneaster, 'lowfast' Peking (Cotoneaster acutifolius)

Common Name (Scientific Name)

Shrubs (continued)

Coyote bush (Baccharis pilularis) Cranberry bush, American (Viburnum trilobum) Cranberry bush, golden (Viburnum opulus aureum) Crape myrtle (Lagestromia indica) Currant, alpine (Ribes alpinum) Dogwood, red osier (Cornus stolonifera) Elaeagnus (Elaeagnus umbellata) Escallonia (Escallonia fradesii) (Escallonia rubia) Euonymus (Euonymus japonica) Euonymus, evergreen (var. Golden, Silver king) Euonymus, winged (Euonymus alata) Fig, creeping (Ficus repens) Firethorn (Pyracantha graberi) Forsythia, greenstem (Forsythia viridissima bronxensis) Flax, New Zealand (Phormium tenax) Fuchsia, Australian (Correa pulchella) Gardenia (var. Mystery, Radicans) (Gardenia augusta) (Gardenia jasminoides) Gardenia. dwarf (var. Veitchii) (Gardenia jasminoides) Gold vine. Guinea (Hibbertia scandens) Hakea (Hakea proteacea) Hawthorn, Indian (Raphiolepis indica) Hibiscus, blue (Alyogyne huegelli) Hibiscus, Chinese (Hibiscus rosa-sinensis)

Common	Name
(Scientif	ic Name)

Shrube (contin

(Scientific Name) Shrube (or

Common Name

Snrubs (continued)	Snrubs (continued)
Holly, dwarf Burford	Liriope, green
(var. <i>Burfordii Nana) (llex cornuta)</i>	<i>(Liriope muscari)</i>
Honeysuckle, bush	Liriope, variegated
(Diervilla lonicera)	(Liriope muscari)
Honeysuckle, cape	Mickey Mouse bush
(Tecomaria capensis)	(Ochna serrulata)
Hydrangea	Mirror plant, creeping
(Hydrangea macrophylla)	(Coprosma repens)
Jasmine, Asiatic	Mock orange
(<i>Trachelopsermum asiaticum</i>)	(Pittosporum tobira)
Jasmine, orange	Mountain lilac, Carmel creeper
<i>(Murraya paniculata)</i>	(Ceanothus griseus)
Jasmine, star	Myrtle, dwarf
(Trachelospermum jasminoides)	(Myrtus communis compacta)
Jasmine, winter	Nandina, heavenly bamboo
<i>(Jasminum nudiflorum)</i>	(Nandina domestica)
Jessamine, Carolina	Nannyberry
(Gelsemium sempervirens)	(Viburnum lantago)
Jojoba (Simmondsia chinensis)	Ninebark (Physocarpus opulifolius) (var. Aureus) (Physocarpus opulifolius var. opulifolius)
Juniper, Chinese (var. Maneyi, Old gold, Pfitzeriana, Sea green, Hekii, Nana, Torulosa, Pfitzeriana Aurea, Pfitzer, Golden Pfitzer) (Juniperus chinensis)	Oleander (Nerium oleander) Orchid. rockrose
Juniper, creeping (var. Bluechip, Hughes, Plumosa, Prince of Wales, Webberi, Wiltonii, Bar Harbor, Andorra, Variegata, Youngstown blue rug) (<i>Juniperus horizontalis</i>)	(Cistus purpureus) Oregon grape (Mahonia aquifolium)
Juniper, Ozark	Osmanthus, holly-leaf
(Juniperus sp.)	(Osmanthus heterophyllus)
Juniper, Rocky Mountain (var. Blue heaven, Welchii, Wichita blue, Medova, Moffet, Pyramidal green, Springtime, Admiral)	Osmanthus, sweet olive (Osmanthus fragrans) Palm, natal (var. Green carpet tuttle) (Carissa grandiflora)
(Juniperus scopulorum) Juniper, savin (var. Skandia, Arcadia, Broadmoor, Buffalo, Pepin) (Juniperus sabina)	Pampas grass (Cortederia selloana) Photinia
Juniper, shore (var. Compacta) (Juniperus conferta)	(Photinia, Sp.) Photinia, Fraser (Photinia fraser)
Juniper, tam	(Pinklady
(var. <i>Tamariscifolia) (Juniperus sabina)</i>	(Rhaphiolenis indica)
Lantana, purple trailing	Pink powder puff
(Lantana montevidensis)	(Calliandra baematocenhala)
Laurustinus (Viburnum tinus)	Pittosporum, variegated Japanese
Lemonade sumac	Plumbago, cape
(Rhus integrifolia)	(Plumbago, capensis)
Lilac, common purple (Syringa vulgaris purpura)	(Frannago caponolo)

Common Name (Scientific Name)

Shrubs (continued)

Podocarpus, yew (Podocarpus macrophyllus) Princess flower (Tibouchina urvilleana) Privet (Ligustrum indica) Privet, glossy (var. Lake Tresca) (Ligustrum lucidum) Privet, Japanese (Ligustrum japonicum) Privet, Texas (Ligustrum texanum) Privet, waxleaf (Ligustrum japonicum) Purple hop bush (Dodonaea viscosa) Pyracantha (Pyracantha graberi) Rhododendron sp. (Rhododendron - Azalea) (var. Hinocrimson, Hershey red, Coral blue, Hinodigiri, Christmas cheer, Pink ruffle, Formosa flame, Delaware Valley white, New white) Sandcherry, purpleleaf (Prunus cistena) Serviceberry, Allegheny (Amelanchier laevis) Serviceberry, Saskatoon (var. Regent) (Amelanchier alnifolia) Silver kina (Euonymus japonica) Sky flower, Brazilian (Duranta stenostachya) Snowball bush (Viburnum opulus sterilis) Spindle tree (Euonymus kiautschovica) Spiraea (Spiraea vanhouteii) (var. Anthony Waterer, Froebellii, Goldflame) (Spiraea bumalda) (var. Fairy Queen) (Spiraea trilobataiovica) (var. Snowbound) (Spiraea nipponicaiovica) Star plant, lavender (Grewia occidentalis) Teatree. Australian (Leptospermum laevigatum) Teatree. New Zealand (var. Red glow) (Leptospermum scoparium)

Common Name (Scientific Name)

Shrubs (continued)

Texas ranger (Leucophyllum frutescens) Toyon, California holly (Heteromeles arbutifolia) Trumpet vine, pink (Pandorea rosea) Veronica (Hebe 'Coed') Viburnum, Japanese (Viburnum japonicum) Viburnum, Sandankwa (Viburnum suspensum) Wayfaring tree (Viburnum lantanoides) Weeping fig, exotica (Ficus benjamina) Wheelers dwarf, Variegated (var. Wheeler) (Pittosporum tobira) Yellow bells (Tecoma stans) Yesterday-today-and-tomorrow (Brunfelsia calycina) Yew (Taxus cuspitata vigatum)

Ornamentals and Bedding Plants

Alyssum (Alyssum sp.) Asparagus, Myers (var. Meyeri) (Asparagus densiflorus) Asparagus, Sprenger's (var. Sprengeri) (Asparagus densiflorus) Aster. New York (Aster novi-belgii) Aster, Stokes (var. Blue, White) (Stokesia cyanae) Baby's breath (var. Bristo fairy) (Gypsophila paniculata) Begonia (Begonia semperflorens) Bellflower, Tussock (var. Canterbury bells) (Campanula carpatica) Bittersweet, American (Celastrus scandens) Black-eyed Susan (var. Goldilocks) (Rudbeckia hirta) Bleeding heart (Dicentra spectabilis)

Common Name	Common Name
(Scientific Name)	(Scientific Name)
Ornamentals and Bedding Plants (continued)	Ornamentals and Bedding Plants (continued)
Butterfly weed	Flowering tobacco
(Asclepias tuberosa)	<i>(Nicotiana</i> sp.)
Bower vine	Fountaingrass, red
(Pandorea jasminoides)	(Pennisetum setaceum)
Cactus, barrel	Gazania
<i>(Echinocactus</i> sp.)	(Gazania ringens leucolaena) (Gazania sp.)
Candytuft	Geranium
(Iberis sempervirens) (Iberis amara)	<i>(Geranium</i> sp.)
Canna	Geranium, Martha Washington
<i>(Canna</i> sp.)	(Pelargonium domesticum)
Cassia, feathery	Gerbera daisy
(Cassia artemisioides)	(Gerbera jamesonii)
Chrysanthemum, Marguerite (Chrysanthemum frutescens) (Chrysanthemum indicum)	Geum (var. Lady Strathedon, Mrs. Bradshaw, Mrs. Bradshaw Improved) (Geum quellyon)
Cockscomb (Celosia argentea) (Canna) Coleus	Gladiolus (Gladiolus sp.)
(Coleus blumei)	Heather, false (Cuphea hyssopifolia)
(var. Gloriosa Dairy) <i>(Echinacea purpurea)</i>	Honeysuckle, Amar (Lonicera maackii)
Coraibelis (Heuchera sanguinea)	Honeysuckle, fly
Coreopsis	(Var. Emeraid Mound, Clavey's Dwart)
(var. Sunray) <i>(Coreopsis lanceolata)</i>	(Lonicera xylosteum)
Cup of gold vine	Honeysuckle, Japanese
<i>(Solandra maxima)</i>	(Lonicera japonica)
Daffodil	Honeysuckle, morrow
<i>(Narcissus</i> spp.)	(Lonicera morrowii)
Dahlia	Honeysuckle, tatarian
(Dahlia pinnata)	(var. Zabeli) <i>(Lonicera tatarica)</i>
Daisy bush	Hopseed bush, purple
(Euryops pectinatus)	(var. <i>Purpurea) (Dodonaea viscosa)</i>
Daisy bush, blue	Impatiens
(Felicia amellioides)	<i>(Impatien</i> s sp.)
Daisy, Shasta	lris
(var. Alaska) <i>(Chrysanthemum maximum)</i>	<i>(Iris</i> sp.)
Daylily	Iris, African
(Hemerocallis hybrids)	(Dietes bicolor)
Dianthus	lvy, grape
(Dianthus deltoides)	(var. Ellen Danica) <i>(Cissus rhombifolia)</i>
Dragonhead, false	Jack-in-the-pulpit
(Physostegia virginiana)	<i>(Arisaema pusillum)</i> (Mrs. Bradshaw Improved)
Dusty Miller	Jade plant
(Centaurea cineraria)	<i>(Crassula argentea)</i>
Fern, Sprenger's asparagus	Jasmine, Madagascar
(Asparagus densiflorus sprengerii)	(Stephanotis floribunda)
Fescue, blue	Lamb's ear
(Festuca ovina)	(Stachys lanata)
Common Name (Scientific Name)

Common Name (Scientific Name)

Ornamentals and Bedding Plants (continued)	Ornamentals and Bedding Plants (continued)
Lavender, English	Purple loosestrife
(Lavandula vera)	(var. Morden's Gleam) (I vthrum virgatum)
Lavender, French	Raspberry ice
(Lavandula dentata)	(Bougainvillea sp.)
Lavender, cotton	Sage
(Santolina chamaecyparissus)	(Salvia greggii)
Lilac, Chinese	Sea pinks, thrift
(Syringa chinensis)	(Armeria maritima)
Lilac, common purple (var. Charles Joly, Ludwig Spaeth, Jay tree) (Svringa vulgaris purpurea)	Sedum, stonecrop <i>(Sedum x rubrotinctum)</i> (Lavender cotton)
Lilac, Meyer (var. Palibin) (Svringa sp.)	(Justicia brandegeeana)
Lilac, Korean	Sky flower, Brazilian (Duranta stenostachya)
Lilac, mountain	Snail vine (Vigna caracalla)
Lily-of-the-Nile, Peter Pan	Snapdragon (Antirrhinum majus)
(Agapanthus africanus)	Speedwell, spike
Lily-of-the-valley	(Veronica spicata)
(Convallaria majalis)	Statice, perennial
Lobelia	(Limonium perezii)
(Lobelia erinus)	Stock
Marigold	(Matthiola incana)
(<i>lagetes</i> sp.)	Sweetgrass
Mirror plant	(Acorus gramineus)
(Coprosma baureri)	Sweet William
Mirror plant, variegated	(Dianthus barbatus)
<i>(Coprosma repens)</i>	Transvaal daisy
Moneywort, creeping Jenny	(Gerbera jamesonii)
(Lysimachia nummularia)	Trumpet vine, blood red
Moss, rose	(Distictis buccinatoria)
<i>(Portulaca grandiflora)</i>	Trumpet vine, lavender
Moss, sandwort	(Clytostoma callistegoides)
<i>(Arenaria verna)</i>	Trumpet vine, pink
Pansy, Johnny-jump-up	(Pandorea rosea)
(Viola tricolor)	Tulip
Pepper, ornamental	(Tulipa spp.)
<i>(Capsicum</i> sp.)	Verbena
Periwinkle, Madagascar	(Verbena sp.)
(Catharanthus roseus) (Vinca minor) Petunia	(Tradescantia sp.)
(Petunia sp.)	(Madeseanna sp.) Wisteria (Misteria sinensis)
(Phlox paniculata)	Yarrow (var. Cerise Oueen) (Achillog millofolium)
<i>(Hosta</i> sp.)	Yarrow, debutante (Achillea taygetea v.)

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Tolerant Plants (continued)

Common Name (Scientific Name)

Ornamentals and Bedding Plants (continued)

Yellow trumpet *(Macfadyena unguis-cati)* Zinnia *(Zinnia elegans*)

Ground Covers

Aaron's beard (Hypericum calycinum) Aptenia (var. Red apple) (Aptenia cordifolia) Bergenia, winter-blooming (Bergenia crassofolia) Bugleweed (Ajuga reptans) Capeweed (Arctotheca calendula) Carpathian, harebell (Campanula carpatica) Cinquefoil, spring (Potentilla tabernaemontani) Coyotebrush (var. Twin Peaks) (Baccharis pilularis) Crownvetch (Coronilla varia) Cushion bush (Calocephalus brownii) Daisy, Freeway (Osteospermum) Daisy, trailing African (Osteospermum) Daisy, white African (Osteospermum fruticosum alba) Gazania, trailing (Gazania regens leucolaena) Green carpet (Herniaria glabra) Ivy, Algerian (Hedera canariensis) Ivy, Boston (Parthenocissus tricuspidata)

Common Name (Scientific Name)

Ground Covers (continued)

Ivy, English (Hedera helix) (var. California) lvy, grape (var. Ellen Danica) (Cissus rhombifolia) Ivy, Hahn's (var. Hahnii) (Hedera helix) Lantana, lavender (Lantana montevidensis) Lilyturf, big blue (Liriope muscari) Lippla (Phyla nodiflora) Mondo grass (Ophiopogon japonicus) Myoporum (var. Prostratum) (Myoporum parvifolium) Pachysandra (Pachysandra terminalis) Periwinkle (Vinca major) Plumbago, dwarf (Ceratostigma plumbaginoides) Pork and beans (Sedum rubrotinctum) Rosea ice plant (Drosanthemum floribundum) Rosemary, dwarf (var. Prostratus) (Rosmarinus officinalis) Rupture wort (Herniaria glabra) St. Johnswort, creeping (Hypericum calycinum) Stonecrop, sedum (Sedum rubrotinctum) Verbena (Verbena officinalis) Verbena, blue (Verbena peruviana)

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007969-00058.20190417c.**NVA 2019-04-025-0076** Based on: NVA 2019-04-025-0074 Supersedes: NVA 2017-04-025-0053

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We create chemistry

Attachment 2 – Literature Search Documentation

Database	Query String
Pubmed	("sethoxydim"[nm] OR 74051-80-2[rn] OR "(+-)-(ZE)-2-(1-Ethoxyiminobutyl)- 5-(2-ethylthio)propyl)-3-hydroxycyclohex-2-enone"[tw] OR "2-(1- (Ethoxyimino)butyl)- 5-(2- (ethylthio)propyl)-3-hydroxycyclohex-2-enone"[tw] OR "2- (1-(Ethoxyimino)butyl)- 5-(2- (ethylthio)propyl)-3-hydroxycyclohex-2-en-1-one"[tw] OR "2-(N-Ethoxybutanimidoyl)- 5-(2- (ethylsulfanyl)propyl]-3-hydroxycyclohex-2-en-1- one"[tw] OR "2-[1-(Ethoxyimino)butyl]-5-(2-ethylthiopropyl)-3-hydroxycyclohex-2-en- 1-on"[tw] OR "2-[1-(Ethoxyimino)butyl]- 5-(2-ethylthiopropyl)-3-hydroxycyclohex-2-en- 1-on"[tw] OR "2-[1-(ethoxyimino)butyl]- 5-(2-ethylthiopropyl)-3-hydroxycyclohex-2- en-1-one"[tw] OR "2-[1-(ethoxyimino)butyl]- 5-(2-ethylthiopropyl)-3- hydroxycyclohex-2-ene-1-one"[tw] OR "2-[1-(Ethoxyimino)butyl]- 5-[2-(ethylthio)propyl]-3-hydroxy-2-cyclohexen-1-one"[tw] OR "2-[1- (Ethoxyimino)butyl]-5-[2-(ethylthio)propyl]-3-hydroxycyclohex-2- en-1-one"[tw] OR "2-[1-(ethoxyimino)butyl]-5-(2-(ethylthio)propyl)-3- hydroxycyclohexen-1-one, 2-(1-(ethoxyimino)butyl]-5-[2-(ethylthio)propyl]-3- hydroxy-"[tw] OR "5-(2-etiltiopropil)-2-[1-(etoximino)butyl]-5-[2-(ethylthio)propyl]-3- hydroxy-"[tw] OR "5-(2-etiltiopropil)-2-[1-(etoximino)butyl]-5-[2-(ethylthio)propyl]-3- hydroxy-"[tw] OR "Aljaden"[tw] OR "Alloxol S"[tw] OR "ARD 34/02"[tw] OR "BAS 9052"[tw] OR "BAS 90520H"[tw] OR "BAS 9052H"[tw] OR "BASF 9052"[tw] OR "CYCLOHEX-2- ENONE, 2-(1-ETHOXYIMINOBUTYL)-3-HYDROXY-5-[2-(ETHYLTHIO)PROPYL]-"[tw] OR "Cyethoxydim"[tw] OR "Fervinal"[tw] OR "Grasidim"[tw] OR "Nabu S"[tw] OR "Poast"[tw] OR "Sertin"[tw] OR "Sethoxydim"[tw] OR "Sethoxydime"[tw] OR "SN 81742"[tw] OR "Tritex-extra"[tw]) AND 2000:3000[dp]
EBSCOhost ¹	SU (Sethoxydim OR Poast OR "2-(1-Ethoxyiminobutyl)-5-(2-(ethylthio)propyl)- 3-hydroxycyclohex-2-enone" OR "2-(1-(Ethoxyimino)butyl)-5-(2-(ethylthio)propyl)-3- hydroxycyclohex-2-enone" OR "2-(1-(Ethoxyimino)butyl)-5-(2-(ethylthio)propyl)-3- hydroxycyclohex-2-enone" OR "2-(1-(Ethoxyimino)butyl)-5-(2-ethylthiopropyl)-3- hydroxycyclohex-2-en-1-one" OR "2-(1-(Ethoxybutanimidoyl)-5-[2- (ethylsulfanyl)propyl]-3-hydroxycyclohex-2-en-1-one" OR "2-[1-(Ethoxyimino)butyl]- 5-(2-ethylthiopropyl)-3-hydroxycyclohex-2-en-1-one" OR "2-[1-(Ethoxyimino)butyl]- 5-(2-ethylthiopropyl)-3-hydroxycyclohex-2-en-1-one" OR "2-[1- (ethoxyimino)butyl]- 5-(2-ethylthiopropyl)-3-hydroxycyclohex-2-en-1-one" OR "2-[1- (Ethoxyimino)butyl]- 5-[2-(ethylthio)propyl]-3-hydroxycyclohex-2-en-1-one" OR "2-[1- (Ethoxyimino)butyl]- 5-[2-(ethylthio)propyl]-3-hydroxycyclohex-2-en-1-one" OR "2-[1- (Ethoxyimino)butyl]- 5-[2-(ethylthio)propyl]-3-hydroxycyclohex-2-en-1-one" OR "2-[1- (Ethoxyimino)butyl]- 5-[2-(ethylthio)propyl]-3-hydroxycyclohex-2-en-1-one" OR "2-Cyclohexen-1-one, 2-(1- (ethoxyimino)butyl]-5-[2-(ethylthio)propyl]-3-hydroxy-" OR "2-Cyclohexen-1-one, 2- [1-(ethoxyimino)butyl]-5-[2-(ethylthio)propyl]-3-hydroxy-" OR "5-(2-etiltiopropil)-2- [1-(etoxiimino)butyl]-5-[2-(ethylthio)propyl]-3-hydroxy-" OR "5-(2-etiltiopropil)-2- [1-(etoxiimino)butyl]-5-[2-(ethylthio)propyl]-3-hydroxy-" OR "5-(2-etiltiopropil)-2- [1-(etoxiimino)butyl]-5-[2-(ethylthio)propyl]-3-hydroxy-" OR "5-(2-etiltiopropil)-2- [1-(etoxiimino)butyl]-5-[2-(ethylthio)propyl]-3-hydroxy-" OR "5-(2-etiltiopropil)-2- [1-(etoxiimino)butyl]-3-hidroxiciclohex-2-en-1-ona" OR "Aljaden" OR "Alloxol S" OR "ARD 34/02" OR "BAS 9052" OR "BAS 90520H" OR "BAS 9052H" OR "BAS 9052" OR "CYCLOHEX-2-ENONE, 2-(1-ETHOXYIMINOBUTYL)-3-HYDROXY-5-[2- (ETHYLTHIO)PROPYL]-" OR "Cyethoxydim" OR "Fervinal" OR "Grasidim" OR "Nabu S" OR "Poast" OR "Sertin" OR "Sethoxydim" OR "Sethoxydime" OR "SN 81742" OR "Tritex-extra") OR TX "74051-80-2"

¹Databases: AGRICOLA, Biological Abstracts, CAB Abstracts, Environment Complete, and Global Health.

Table 2-2. Gre	y Literature So	ources Searched
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Source	URL(s)
AICIS	https://services.industrialchemicals.gov.au/search-assessments/
ATSDR	https://www.atsdr.cdc.gov/toxprofiledocs/index.html
CalEPA	https://oehha.ca.gov/chemicals
ChemView	https://chemview.epa.gov/chemview
ECETOC	https://www.ecetoc.org/publications/
ECHA	https://chem.echa.europa.eu/
ΕϹΟΤΟΧ	https://cfpub.epa.gov/ecotox/
EFSA	https://www.efsa.europa.eu/en/search
FDA	https://www.fda.gov/
IARC	https://monographs.iarc.who.int/list-of-classifications
INCHEM	https://www.inchem.org/#/
IRIS	https://iris.epa.gov/AdvancedSearch/
J-CHECK	http://www.safe.nite.go.jp/jcheck/search.action?request_locale=en
JECDB	http://dra4.nihs.go.jp/mhlw_data/jsp/SearchPageENG.jsp
NIEHS	http://www.niehs.nih.gov/
NPIRS	https://www.npirs.org/
NTP	https://ntpsearch.niehs.nih.gov/home
NTRL	https://ntrl.ntis.gov/NTRL/
OECD	https://www.echemportal.org/echemportal/ and https://hpvchemicals.oecd.org/UI/Search.aspx
OSHA	https://www.osha.gov/chemicaldata/
Pesticide Chemical Search	https://ordspub.epa.gov/ords/pesticides/f?p=chemicalsearch:1
PPRTV	https://www.epa.gov/pprtv/provisional-peer-reviewed-toxicity-values- pprtvs-assessments
PubChem	https://pubchem.ncbi.nlm.nih.gov/
Regulations.gov	https://www.regulations.gov/
WHO	https://apps.who.int/iris/

Abbreviations: AICIS = Australian Industrial Chemicals Introduction Scheme; ATSDR = Agency for Toxic Substances and Disease Registry; CalEPA = California Environmental Protection Agency; ECETOC = European Centre for Ecotoxicology and Toxicology of Chemicals; ECHA = European Chemicals Agency; EFSA = European Food Safety Authority; FDA = Food and Drug Administration; IARC = International Agency for Research on Cancer; IRIS = Integrated Risk Information System; J-CHECK = Japan Chemicals Collaborative Knowledge database; JECDB = Japan Existing Chemical Data Base; NIEHS = National Institute of Environmental Health Sciences; NPIRS = National Pesticide Information Retrieval System; NTP = National Toxicology Program; NTRL = National Technical Reports Library; OECD = Organisation for Economic Co-operation and Development; OSHA = Occupational Safety and Health Administration; PPRTV = Provisional Peer-Reviewed Toxicity Value; WHO = World Health Organization 🎬 Results of Run

Attachment 3 -	Documentation	for Use	of GLEAMS
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			D	of Dur								
Results of Run Decenter Decemeter Median Lewer Limit Upper Limit In Volue												
	Site01	SOIL 12		8 81 E-02	8 02E-02	0.025						
ľ	Sile01	SOILIZ	0.091-02	0.010-02	0.921-02	0.020						
	SileUI	SUIL30	2.90E-02	2.94E-02	2.97E-02	0.025						
	Siteo	Solimax	3.00E+01	2.40E+01	3.00E+01	0.025						
	WatBd01	Conc001	1.22E-02	2.39E-03	7.08E-02	0.025						
	WatBd01	Conc365	5.70E-03	1.24E-03	2.84E-02	0.025						
	OffSite01	EffApRate	9.18E-03	1.74E-03	6.16E-02	0.025						
·	These results a	are also saved	in the Results	File (plain tex	t) as well as							
-	the Access dat	abase that yo	u specified.									
	Nata that the li	mito oro ompir	icol (coo the d	anumantation								
	Note that the I	mits are empir	ical (see the d	ocumentation).							
	The units are ir	n pom for soil (ma/ka) and wa	ater (ma/L) cor	centrations.							
-	The units for a	pplication rate	are Ib/acre. T	he units for so	oil penetration	are in inches.						
		•			•							
GI GI						>						
Si GE	EAMS Quick Run NERAL INFORMA			No. of V	Veather-Year Sets: 10	- D						
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Attachment 4 – Documentation for Worksheets Version 2.02 HHERAs

Table 1: General Information on Chemical					
Field	Value	Note			
ChemCode	Seth2024	Use up to 12 characters. Anything beyond 12 characters is			
		ignored. If the ChemCode is currently in use, this code			
		may be changed by the program. This will not impact			
		your ability to run WorksheetMaker with the new or the			
		preexisting chemical.			
ChemName	Sethoxydim2024	Enter the name of the chemical here. Up to 255 characters			
	-	are allowed.			
TypePesticide	Herbicide	If appropriate, enter one of the following: Herbicide,			
		Insecticide, Piscicide, Rodenticide, or			
		Fungicide. You can use another name or leave this			
		blank.			
RA_Number		If you are using a risk assessment or other document, you			
		may want to enter a reference number with a maximum of			
		50 characters. You can leave this blank.			
RA_Date	9/30/2024	You can enter a date in this field or leave it blank.			
Table Type	ChemsAvail	Do not change this row.			

Table 2: Chemical Properties						
InfoType	PropCode	Receptor	Value	Units	Reference	
BscInfo	MW		327.5	grams/mole	BASF 2000	
BscInfo	WS		4700	mg/L	pH 7 20C	
BscInfo	Kow		1.65	unitless		
Kinetics	T12_C	Fruit	3	days		
Kinetics	T12_L	Fruit	3	days		
Kinetics	T12_U	Fruit	3	days		
Kinetics	T12_C	VegNOS	3	days		
Kinetics	T12_L	VegNOS	3	days		
Kinetics	T12_U	VegNOS	3	days		
BCF	BCF_Ed_Ac		1.2	L/kg fish		
BCF	BCF_Ed_Ch		7	L/kg fish		
BCF	BCF_WF_Ac		3.6	L/kg fish		
BCF	BCF_WF_Ch		21	L/kg fish		
DrmAbs	Kp_C		0.00027	cm/hour	2001 WSM	
DrmAbs	Kp_L		0.00017	cm/hour	2001 WSM	
DrmAbs	Kp_U		0.00042	cm/hour	2001 WSM	
DrmAbs	ka_C		0.0011	per hour	2001 WSM	
DrmAbs	ka_L		0.00047	per hour	2001 WSM	
DrmAbs	ka_U		0.0025	per hour	2001 WSM	
Table Type	ChemProps	Do not cha	ange this row.			

Table 3: Toxic	Table 3: Toxicity Values						
Receptor	Dur	Sens	Route	Endpoint	Value	Units	Reference
Hum	Ac			RfD	0.6	mg/kg bw	USDA FS 2001 (U.S.EPA/OPP 1998)
Hum	Ch			RfD	0.09	mg/kg bw/day	USDA FS 2001 (IRDC 1984)
Hum	Ch			CancRisk		mg/kg bw/day	
AdlFe	Ac			RfD	0.6	mg/kg bw/day	USDA FS 2001 (U.S.EPA/OPP 1998)
AdlFe	Ch			RfD	0.09	mg/kg bw	USDA FS 2001 (IRDC 1984)
Wrkr	Ch			RfD	0.09	mg/kg bw/day	USDA FS 2001 (IRDC 1984)
Mam	Ac			NOAEL	180	mg/kg bw	USDA FS 2001 (U.S.EPA/OPP 1998)
Mam	Ch			NOAEL	9	mg/kg bw/day	USDA FS 2001 (IRDC 1984)
MamCrn	Ac			NOAEL	180	mg/kg bw	USDA FS 2001 (U.S.EPA/OPP 1998)
MamCrn	Ch			NOAEL	9	mg/kg bw/day	USDA FS 2001 (IRDC 1984)
Brd	Ac			NOAEL	500	mg/kg bw	USDA FS 2001 (Bryceland et al. 1997)
Brd	Ch			NOAEL	10	mg/kg bw/day	USDAFS 2001 (Beavers 1996)
HonBee	Ac		Oral	NOAEL	107	mg/kg bw	USDA FS 2001 (BASF 1992)
HonBee	Ac		Contact	NOAEL	107	mg/kg bw	USDA FS 2001 (BASF 1992)
InsectHerb	Ac			NOAEL	107	mg/kg bw	USDA FS 2001 (BASF 1992)
TrPlnt	VegVig	Sn		NOAEL	0.003	lb/acre	MRID 47691704
TrPlnt	VegVig	T1		NOAEL	2.4	lb/acre	MRID 50420003
TrPlnt	SdlE	Sn		NOAEL	0.0073	lb/acre	MRID 50420002
TrPlnt	SdlE	T1		NOAEL	1.9	lb/acre	MRID 50420002
AqInv	Ac	Sn		NOAEC	2.6	mg/L	USDA FS 2001 (Bryceland et al. 1997)
AqInv	Ac	T1		NOAEC	78.1	mg/L	MRID 00042816 (in EPA 2019)
AqInv	Ch	Sn		NOAEC		mg/L	
AqInv	Ch	T1		NOAEC		mg/L	
Amph	Ac	Sn		NUAEC		mg/L	
Amph	Ac	T1		NUAEC		mg/L	
Amph	Ch	Sn		NOAEC		mg/L	
Amph	Ch	T1		NOAEC		mg/L	
Fsh	Ac	Sn		NOAEC	0.41	mg/L	MRID 47691701
Fsh	Ac	T1		NOAEC	1.2	mg/L	USDA FS 2001
Fsh	Ch	Sn		NUAEC	0.23	mg/L	MRID 4/691/03
rsn	Ch	TL		NUABC	0.23	mg/L	MRID 47691703
Alg		Sn		NOAEC	0.25	mg/L	MRID 4362601 as cited in U.S.EPA/OPP 2019
Alg		T1		NOAEC	0.25	mg/L	U.S.EPA/OPP 2019
Mcrph		Sn		NOAEC	0.0356	mg/L	MRID 48000902
Mcrph		T1		NOAEC	.25	mg/L	USDAFS 2001
Table Type	ToxVals	Do n	ot change	this row.			

Table 4: Water Contamination Rates						
Dur	Modifier	Value	Reference			
Ac	с	.0122	GLEAMS Driver			
Ac	L	.0024	GLEAMS Driver			
Ac	U	.0708	GLEAMS Driver			
Ch	с	.0057	GLEAMS Driver			
Ch	L	.0012	GLEAMS Driver			
Ch	U	.0284	GLEAMS Driver			
Table Type	AmbientWat	Do not change this row				

Table 5: Offsite Contamination of Soil						
Dur	Modifier	Value	Reference			
Ac	С	.0092	GLEAMS Driver			
Ac	L	.0017	GLEAMS Driver			
Ac	υ	.0616	GLEAMS Driver			
Table Type	RunoffRates	Do not change th	is row			

Table 8:	Table 8: Template for Foliar Application Formulation					
Code	Item	Value	Permitted	Comment		
			Values			
		STANDAR	D REQUIRED ITEN	MS		
Form Name	FormulationName	Poast	Any text	Commercial name on product label		
Chem Name	Pesticide name	Sethoxydim2024	Name	This must correspond to the name of a pesticide that is in WorksheetMaker.		
Farm	Typeof	Liquid	Liquid,			
Tumo	Formulation		Granular,			
туре			orPowder			
PerCe ntActi ve	Percent active ingredient	18	Number	A numeric value for the percent (w/w) a.i. or a.e. in the formulation. For weak acids, enter the % a.e. Do not enter the value as a proportion. Thus, for a sixty percent a.i. or a.e. enter 60rather than 0.6. You can enter a % sign but this will be ignored.		
LbPer Gal	Lbs a.i. or a.e./gallon		Number,ULV, or blank	A numeric value for the pounds a.i. or a.e. per gallon in the formulation. For weak acids, enter the lbs a.e./gallon. Leave blank for granular or powder formulations. For ultralow volume applications, simply enter ULV in the Value column. If ULV is used, the bulk density of the formulation must be entered as a Special Property. See below.		
Activ	Classification of	a.i.	a.i.or	Use a.e. for esters of weak acids.		
eType	active ingredient.		a.e.			
ApRt	Application rate	0.28,0.09,0.49	Number or CLU	Use units of lbs/acre. Use a.e. for weak acids or their esters and a.i. for other pesticides.		
ApVo	Application	0.19,0.063, 0.31	Number or	Gallons per acre of field solution.		
1	volume		CLU			
ApMe thod	Application method(s)		Aerial, Bkpk, and/or Boom	Use any or all of the codes to the left for aerial application (Aerial), backpack application (Bkpk), or ground boom (Boom)		

Attachment 5 – Studies of Toxicity to Ecological Receptors of Sethoxydim Published Since the 2001 HHERA

Table 5-1. Studies of Acute and Chroni	c Toxicity to Birds of Technical-Grad	le Sethoxydim Published Since the 2001 HHERA
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Study Basis	Species	Exposure	Response	Reference
Acute (dietary- based)	Canary (<i>Serinus</i> <i>canaria</i>), 7- to 24-month-old males and females (five birds/sex/ dose) M/F initial body weight: 17.2-31.8 g	BAS 562 H (sethoxydim) (purity: 97.1% a.i.) in 1.5% acetone and diet. Nominal dietary concentrations: 0, 313, 625, 1250, 2500, and 5000 mg a.i./kg diet. Reviewer-calculated mean measured dietary concentrations: <100 (<loq), 1998,<br="" 247,="" 441,="" 994,="">and 4341 mg a.i./kg diet. Doses: 0, 37, 67, 150, 302, and 657 mg a.i./kg/day (doses calculated by multiplying dietary concentration by food conversion factor¹). Five-day exposure period followed by an additional three days of observation.</loq),>	LC ₅₀ : >657 mg a.i./kg/day. NOAEC: 657 mg a.i./kg/day. No mortality or clinical signs of toxicity observed in any dose group. No body weight gain or food consumption differences between treated and control animals. No treatment- related abnormalities seen at necropsy.	MRID 50542501 Hubbard et al. (2018) Acceptable/ Guideline

Study Basis	Species	Exposure	Response	Reference
Chronic (dietary- based)	Mallard duck (<i>Anas</i> <i>platyrhynchos</i>), 7- month-old males and females (16 pairs birds/sex/dose) M initial body weight: 1088.3- 1148.7 g F initial body weight: 1043.5- 1050.7 g	 BAS 562 H (sethoxydim) (purity: 94.8% a.i.) in diet. Nominal dietary concentrations (adjusted for 94.8% purity): 0, 250, 500, and 1000 mg a.i./kg diet. Reviewer-calculated mean measured dietary concentrations (adjusted for 94.8% purity): <lod, 234,="" 466,="" 953="" a.i.="" and="" diet.<="" kg="" li="" mg=""> Doses: 0, 26, 52, and 106 mg a.i./kg/day (doses calculated by multiplying dietary concentration by food conversion factor²). Dietary exposure nine weeks prior to egg-laying, followed by 11 additional weeks of exposure. </lod,>	 Reproductive: M/F NOAEC: 52 mg a.i./kg/day. M/F LOAEC: 106 mg a.i./kg/day. LOAEC based on significant reduction (12% reduction from control; p=0.011) in proportion of hatchlings to live three-week viable embryos. No effects on mortality, clinical signs of toxicity, body weight, or food consumption in adult birds. No treatment-related reductions in reproductive parameters (eggs laid, eggs cracked, egg weight, shell thickness, eggs set, viable 14-day embryos, 14-day-old survivors and survivor weight, or hatchling weight) compared to controls. 26 and 52 mg a.i./kg/day: No treatment-related effects. 106 mg a.i./kg/day: Significant (12%) reduction in proportion of hatchlings to live three-week viable embryos compared to controls. 	MRID 48000901 Zok (2009) Acceptable/ Guideline

¹Average daily food consumption/bird » 3.2 g; average body weight » 21.3 g; food conversion factor: $3.2 \text{ g} \div 21.3 \text{ g} = 0.15 \text{ g}$ food/g bw. Food consumption was reported as group averages for each treatment group on Days 0 – 4 (exposure) and Days 5 – 7 (observation). Average food consumption was determined as the average of these two rates (3.35 g/day [Days 0 – 4] and 3.1 g/day [Days 5 – 7]). Body weights were reported as group averages for each treatment group at the beginning of exposure (Day 0) Day 1, end of exposure (Day 5), and end of observation period (Day 8). To determine an average body weight, the average of Day 0 (21.8 g), Day 1 (21.5 g), Day 5 (20.9 g), and Day 8 (20.9 g) weights was taken.

2Average daily food consumption/bird » 125 g; average body weight » 1130 g; food conversion factor: 125 g ÷ 1130 g = 0.11 g food/g bw. Food consumption was reported as the mean food consumption rate for each treatment group; average food consumption was determined as the average of these four rates (120.2, 123.2, 128.5, and

128.7 g/day). Body weights were reported as male and female averages for each treatment group at test initiation, Week 8, and test termination. To determine the average body weight, the average of each of these time points, for males, females, and treatment groups was taken.

Abbreviations: a.i. = active ingredient; bw = body weight; F = female; g = gram; HHERA = Human Health and Ecological Risk Assessment; LC50 = median lethal concentration; LOAEC = lowest-observed-adverse-effect concentration; LOD = limit of detection; LOQ = limit of quantification; kg = kilogram; M = male; mg = milligram; NOAEC = no-observed-adverse-effect concentration

Study Basis	Species	Exposure	Response	Reference
Acute (oral	Honeybee (Apis	BAS 562 H (sethoxydim) (purity: 97.2% a.i.) in	Oral test:	MRID 50420004
and	mellifera), three-	1% acetone and 1% Tween [®] 80 (in 50% sucrose	LC ₅₀ : >200.2 μg a.i./bee.	Franke (2017)
contact)	to five-week-old	solution for oral test).	NOAEL: 200.2 μg a.i./bee.	A
	bees	Nominal doses (oral and contact test): 0, 12.5,	LOAEL: >200.2 μg a.i./bee.	Acceptable/
	(30 bees/dose)	25, 50.1, 100.1, and 200.2 μg a.i./bee.	Contact test:	Guideline
		In oral test, bees were fed sucrose solution	LD ₅₀ : >200.2 μg a.i./bee.	
		containing the test item, following a one-hour	NOAEL: 200.2 μg a.i./bee.	
		starvation period. Feeding tubes were empty	LOAEL: >200.2 μg a.i./bee.	
		2.5 hours after application.	No treatment-related mortality (other than 3%	
		In contact test, a single droplet of 2-µL test	mortality in the oral test at 200.2 μ g a.i./bee) or	
		solution was placed on the dorsal bee thorax.	clinical signs of toxicity.	
		Observations made at 4, 24, and 48 hours.	Classified as "practically non-toxic."	

Table 5-2a. Studies of Acute and Chronic Toxicity to Terrestrial Invertebrates of Technical-Grade Sethoxydim Published Since the 2001 HHERA

Study Basis	Species	Exposure	Response	Reference
Chronic	Honeybee (Apis	BAS 562 H (sethoxydim) (purity: 97.2% a.i.) in	ED ₅₀ : >21 μg a.i./bee/day.	MRID 50420005
(repeated dose)	<i>mellifera</i>), first instar larvae (three-day-old) bees (36 larvae/dose)	 0.5% acetone and diet. Nominal dietary concentrations: 0, 40, 79, 158, 316, and 633 mg a.i./kg diet. Reviewer-calculated mean-measured dietary concentrations: 0, 35.4, 69.3, 145, 286, and 536 mg a.i./kg diet. 	NOAEL: 21 μg a.i./bee/day. LOAEL: >21 μg a.i./bee/day. Mortality, sublethal effects, and emergence not significantly different from controls in any dose group.	Kleebaum (2017) Acceptable/Non- Guideline
		Nominal cumulative doses: 0, 6.3, 12.5, 25, 50, and 100 μg a.i./larva.		
		Reviewer-calculated measured cumulative doses (based on percent recovery of nominal concentrations): 0, 5.6, 11, 23, 46, and 85 μg a.i./larva.		
		Reviewer-calculated measured daily doses: 0, 1.4, 2.8, 5.8, 11, and 21 μg a.i./bee/day.		
		Four-day larval exposure period (Days 3-6); larval mortality assessed on Day 8; adult emergence rate assessed on Day 22.		

Study Basis	Species	Exposure	Response	Reference
Chronic	Honeybee (Apis	BAS 562 H (sethoxydim) (purity: 97.2% a.i.) in	NOAEL: 4.38 µg a.i./bee/day.	MRID 50420006
(repeated	<i>mellifera</i>), <two-< td=""><td>5% acetone and diet (50% aqueous sucrose</td><td>LOAEL: 7.29 μg a.i./bee/day.</td><td>Ruhland (2017)</td></two-<>	5% acetone and diet (50% aqueous sucrose	LOAEL: 7.29 μg a.i./bee/day.	Ruhland (2017)
dose)	day-old bees (30 bees/dose)	solution). Nominal dietary concentrations: 0, 0.163, 0.327, 0.654, 1.307, 2.614 g a.i./kg. Nominal doses: 0, 6.3, 12.5, 25, 50, and 100.1 μg a.i./bee/day. Reviewer-calculated mean measured doses: 0, 4.38, 7.29, 15.8, 30.8, and 59.3 μg a.i./bee/day. 10-day exposure in diet.	LOAEL based on significantly lower food consumption (22.3-26.9 mg/bee/day) in treated bees compared to controls (25.7- 32.6 mg/bee/day). LD ₅₀ : >59.3 μg a.i./bee/day. NOAEL: 30.8 μg a.i./bee/day. LOAEL: 59.3 μg a.i./bee/day. LOAEL based on significant increase in mortality (17%) in treated bees compared to controls.	Acceptable/Non- Guideline
Chronic (repeated dose)	Soil microbes	Sethoxydim (purity not reported). Application rate: 200 g a.i./ha (equivalent to 0.178 lb a.i./acre). Greenhouse experiment: sprayed on soil surface; soil microbial biomass and bacterial diversity measured weekly for four weeks after treatment. Field experiment: sprayed on soil surface; soil microbial biomass and bacterial diversity measured one hour before and after treatment and then weekly for four weeks.	NOAEL: 0.178 lb a.i./acre. LOAEL: >0.178 lb a.i./acre. Microbial biomass and diversity were not significantly different from controls in either experiment.	Lupwayi et al. (2004)

Study Basis	Species	Exposure	Response	Reference
Acute	Puget blue butterfly (<i>Icaricia</i> [<i>Plebejus</i>] <i>icarioides blackmorei</i> Barnes and McDunnough), Silvery blue butterfly (<i>Glaucopsyche</i> <i>lygdamus</i> Doubleday), Ochre ringlet butterfly (<i>Coenonympha tullia</i> Müller), and Wood nymph butterfly (<i>Cercyonis pegala</i> Fabricius), eggs or pre- diapause larvae (at least 20/field plot)	Formulated sethoxydim product (Poast; purity not reported) and nonionic surfactant (Agridex®). Application rate: 526 g a.i./ha (0.469 lb a.i./acre). Assessed larval performance (feeding) and oviposition (total eggs laid) of Puget blue butterflies and adult butterfly behavior (residence time) of all four species beginning one week after spraying.	 NOAEC <0.469 lb a.i./acre. LOAEC: 0.469 lb a.i./acre. LOAEC based on significantly reduced average residence time in treated plots. Percent reduction (%): Puget blue butterfly M: 31.0; F: 78.3 Silvery blue butterfly M: 45.8; F: 62.0 Ochre ringlet butterfly M: 23.0 Wood nymph butterfly M: 26.1 Butterfly oviposition (eggs laid) and larval feeding damage were not significantly different between treated and control groups. 	LaBar and Schultz (2012)

Table 5-2b. Studies of Acute and Chronic Toxicity to Terrestrial Invertebrates of Formulated Sethoxydim Product Published Since the 2001 HHERA

Study Basis Sp	pecies	Exposure	Response	Reference
Chronic Bu icu ar th (3	Butterfly (<i>Icaricia</i> <i>carioides blackmorei</i> nd <i>Pieris rapae</i>), hird instar larvae 34 larvae/treatment)	Formulated sethoxydim product (Poast; purity: 18% a.i.) in surfactant (Preference®). Application rate: 1.9 oz/gallon sethoxydim product (equivalent to 2560 mg a.i./L) and 1 oz/gallon surfactant (6 mL of formulated sethoxydim product and 3 mL of surfactant in 400 mL water). <i>I. icarioides</i> third instar larvae placed on lupine plants, which were then sprayed and left to dry for ~15 minutes. <i>P. rapae</i> larvae were placed in plastic cups and sprayed directly. Percent survival, sex ratio, development time to pupal and adult life stages, biomass, and adult morphology were evaluated. Larvae were observed every two days to record mortality and feeding behavior. Newly emerged adults were weighed, sexed, and photographed for morphology measurements (as indicator of reproductive fitness).	 P. rapae: NOAEC: <2560 mg a.i./L. LOAEC 2560 mg a.i./L. LOAEC based on increased mortality in treated groups (32% decrease in survival compared to control; p<0.001); female pupae in treated groups weighed significantly less compared to controls (180 versus 201 mg in controls); significant reduction in wing area for treated males and females (9 and 14%, respectively). No treatment-related effects on sex ratio, development time, male pupal weight, or adult weight. <i>I. icarioides:</i> NOAEC: <2560 mg a.i./L. LOAEC 2560 mg a.i./L. LOAEC based on reduced development time to pupation (16 versus 28 days) and to adults (33 versus 43 days). No treatment-related effects on survival, sex ratio, pupal weight, adult weight, or morphology. 	Russell and Schultz (2010)

Study Basis	Species	Exposure	Response	Reference
Chronic	Behr's metalmark butterfly (<i>Apodemia</i> <i>virgulti</i> Behr), first instar larvae (40 larvae/treatment)	Formulated sethoxydim product (Poast; purity: 18% a.i.). Application rate: 1.75 L product/ha (equivalent to 1.63 lb product/acre, or 0.29 lb a.i./acre). Exposed first instar larvae and their food (buckwheat) via direct application. New food plants (also treated) were given to larvae every day until pupation. Survival recorded daily. Pupae weighed; emerged adults were sexed, and one female and one male moved to oviposition cups and fed treated buckwheat. Number of eggs laid over female's lifespan recorded. Also recorded pupal length and weight, adult body length, adult abdomen width, diagonal hind wing length, and adult body weight.	NOAEC: <0.29 lb a.i./acre. LOAEC: 0.29 lb a.i./acre. Significant reduction in number of pupae produced and, therefore, the number of adults that emerged compared to controls (emergence was 27% lower in the treatment group compared to the control; p=0.008). No other significant effects on other parameters measured.	Stark et al. (2012)

Abbreviations: a.i. = active ingredient; ED_{50} = median effects dose; g = gram; ha = hectare; HHERA = Human Health and Ecological Risk Assessment; kg = kilogram; L = liter; lb = pound; LC_{50} = median lethal concentration; LD_{50} = median lethal dose; LOAEC = lowest-observed-adverse-effect concentration; LOAEL = lowest-observed-adverse-effect level; mg = milligram; NOAEC = no-observed-adverse-effect concentration; NOAEL = no-observed-adverse-effect level; oz = ounce; μ g = microgram; μ L = microliter

Table 5-3a. Studies of Toxicity to Terrestrial Plants of Technical-Grade Sethoxydim Published Since the 2001 HHERA

Species	Exposure	Response	Reference
Grain sorghum (Sorghum bicolor)	Field study: Assumed to be technical-grade sethoxydim (purity not reported). Application rate: 0, 1.68, 5.09, 16.8, 56, and 70 g a.i./ha (equivalent to 0, 0.0015, 0.0045, 0.015, and 0.05 lb a.i./acre). Sprayed once one-month-old seedlings. Evaluated visible injury two and eight weeks after treatment, and yield. Four sites evaluated in two consecutive years. Soil type: silt loam, silty clay loam, sandy loam, and clay loam (OM 1.7-3.7%; pH 5.6-7.8).	Visible injury to leaves: NOAEC: 0.0015 lb a.i./acre. LOAEC: 0.0045 lb a.i./acre. Growth initially stunted at two highest concentrations but recovered 20-30 days after treatment.	Al-Khatib et al. (2003)
Rape (<i>Brassica napus</i> L.)	Assumed to be technical-grade sethoxydim (purity not reported). Application rate: 10 ⁻³ Molar (equivalent to 327 mg a.i./L). Sprayed on seedlings at first leaf stage; evaluated neoformed leaves two weeks after exposure.	NOAEC: <327 mg a.i./L. LOAEC: 327 mg a.i./L. LOAEC based on significant reduction in growth rate (50% less than controls; p≤0.05), chlorophyll (25% less than controls; p≤0.05), and lipid content (38% less than controls; p≤0.05).	Belkebir and Benhassaine- Kesri (2013)

Species	Exposure	Response	Reference
Sesame (Sesamum	Field study:	NOAEC: 0.187 lb a.i./acre.	Grichar et al.
indicum L.)	Assumed to be technical-grade sethoxydim (purity not reported) and a 1% crop oil concentrate (Agridex [®]).	LOAEC: >0.187 lb a.i./acre. No treatment-related stunting, injury, or yield	(2001)
	Application rate: 0.21 kg a.i./ha (equivalent to 0.187 lb a.i./acre).	reduction observed.	
	Sprayed three to six weeks after planting when seedlings were 30-48 cm high. Populations counted three weeks after exposure; growth determined four weeks prior to harvest; injury evaluated on a scale of 0 to 100 (no stunting to complete death). Location: Texas.		
Oat (<i>Avena sativa</i> L. cv. Zenshin)	Assumed to be technical-grade sethoxydim (purity not reported), in 1% acetone and 0.1% Tween 20. Application rate: 0, 1, and 10 µmol a.i./L (equivalent to 0, 0.33, and 3.3 mg a.i./L).	NOAEC: 0.33 mg a.i./L. LOAEC: 3.3 mg a.i./L. LOAEC based on significant effects on seedling growth and chlorosis.	Luo et al. (2001)
	Shoots of three seedlings exposed for two hours, then rinsed in distilled water and grown in nutrient solution. Separately, top, middle, or basal part of shoots exposed to 3.3 mg a.i./L test solution for two hours. Fresh weight and shoot length of seedlings measured prior to and 48, 96, and 144 hours after treatment.		

Species	Exposure	Response	Reference
Jamaican nettletree (<i>Trema micrantha</i>), Peruvian peppertree (<i>Schinus molle</i>), and garapeira (<i>Apuleia</i> <i>leiocarpa</i>)	Technical-grade sethoxydim (purity not reported, but concentrations given in a.i.) in 0.5% Assist® (mineral oil). Application rate: 0 and 184 g a.i./ha (equivalent to 0.16 lb a.i./acre). Seedlings sprayed 60-70 days after transplanting. Evaluated stem diameter, plant height, and phytotoxicity at 7, 14, 21, 28, 35, and 42 days after application, plus shoot dry matter accumulation at 42 days.	NOAEC: 0.16 lb a.i./acre. LOAEC: >0.16 lb a.i./acre. No phytotoxicity was observed, and there was no significant effect on stem diameter, plant height, or accumulation of dry matter for any plant species.	Oliveira et al. (2019)
Brazilian ornamental plants Ostrich plume (<i>Alpinia purpurata</i>), strelitzia (<i>Strelitzia</i> <i>reginae</i>), and parrot's beak (<i>Heliconia</i> <i>psittacorum</i>) Four plants/dose	Technical-grade sethoxydim (purity not reported, but concentrations given in a.i.). Application rate: 0 or 184 g a.i./ha (equivalent to 0.16 lb a.i./acre). Plants were sprayed; visual exam for phytotoxicity and growth measurements conducted on 7, 14, 21, 28, 35, and 42 days after application (for ostrich plume, also evaluated on 49 days). At termination, shoot dry mass determined.	Shoot dry weight (<i>Strelitzia reginae</i>): NOAEC: <0.16 lb a.i./acre. LOAEC: 0.16 lb a.i./acre. LOAEC based on significant reduction in shoot dry weight compared to controls. No significant effects on growth rate. Degree of phytointoxication ranged from 0 to 2.5%.	Queiroz et al. (2016)

Table 5-3b. Studies of Toxicity to Terrestrial Plants of Formulated Sethoxydim Product Published Since the 2001 HHERA

Species	Exposure	Response	Reference
Monocots	Formulated sethoxydim product	Most sensitive monocot:	MRID
Corn (Zea mays)	(Poast; purity: 19.6% a.i.).	Ryegrass (dry weight)	47691704
Oat (Avena sativa)	Range of application rates tested	EC ₂₅ : 0.0086 lb a.i./acre	Bergfield
	varied by species from 0.00105 to	NOAEC: 0.00276 lb a.i./acre.	(2009)
Ryegrass (Lollum	0.426 lb a.i./acre with negative	Corn (dry weight)	Supplemental
	labeled rate: 0.470 lb a i /acre)	EC ₂₅ : 0.019 lb a.i./acre.	(only
40-48 plants/dose		NOAEC: 0.0133 lb a.i./acre.	evaluated
	Applied to plant via overhead	Oat (dry weight)	three monocots)
	stage; 21-day vegetative vigor	EC ₂₅ : 0.044 lb a.i./acre.	monocots
	test.	NOAEC: 0.0303 lb a.i./acre.	
		Percent survival was significantly reduced for all species at the highest test	
		concentration (0-33% survival); shoot length inhibition was high (62-83%)	
		at the two highest treatment levels. Low to severe phytotoxic effects (e.g., stunting, chlorosis, necrosis) observed across all species; corn also had	
		wrinkled or malformed leaves depending on concentration.	

Species	Exposure	Response	Reference
Monocots	Formulated sethoxydim product	Most sensitive monocot:	MRID
Onion (Allium cepa)	(purity: 18.55% a.i.) in methylated	Onion (no significant toxicity to any endpoint)	50420003
Dicots	seed oil and ammonium sulfate.	EC ₂₅ : >2.2 lb a.i./acre.	McKelvey et
	Range of application rates tested	NOAEC: 2.2 lb a.i./acre.	al. (2017)
Cabbage (Brassica	varied by species from 0.0071 to	Most sensitive dicot:	Acceptable
oleracea)	2.4 lb a.i./acre with negative and	Cabbage (dry weight)	(intended to
Oilseed rape	labeled rate: not reported).	EC ₂₅ : 2.44 lb a.i./acre.	supplement
(Brassica napus)	Applied to plant via overhead	NOAEC: 0.68 lb a.i./acre.	MRID 47601704)
Soybean (<i>Glycine</i>	truck spraver at the 2-3 true leaf	Soybean (height)	47091704)
max)	stage; 21-day vegetative vigor	EC_{25} : >2.2 lb a.i./acre.	
Sugarbeet (Beta	test.	NOAEC: 0.74 lb a.i./acre.	
vulgaris)		No significant effects on emergence, survival, height, or weight observed	
Lettuce (Lactuca		in lettuce, oilseed rape, sugarbeet, or tomato (NOAEC: 2.4 lb a.i./acre).	
sativa)		All species displayed slight phytotoxic effects, including chlorosis, necrosis,	
Tomato		leaf curl, stem curl, color change, and insect damage.	
(Lycopersicon			
esculentum)			
30 plants/dose			

Species	Exposure	Response	Reference
Monocots: Corn (<i>Zea mays</i>) Onion (<i>Allium cepa</i>)	Formulated sethoxydim product (purity: 18.55% a.i.). Range of application rates tested	Most sensitive monocot: Ryegrass (survival) EC ₂₅ : 0.046 lb a.i./acre. NOAEC: 0.02 lb a.i./acre.	MRID 50420002 McKelvey et
Ryegrass (Lolium perenne) Wheat (Triticum aestivum) Dicots:	1.9 lb a.i./acre with negative and solvent controls (maximum labeled rate: not reported). Applied to surface soil pre- emergence via overhead track	Corn (dry weight) EC ₂₅ : 0.282 lb a.i./acre. NOAEC: 0.20 lb a.i./acre. Wheat (dry weight) EC ₂₅ : 0.112 lb a.i./acre.	Supplemental (quantitative)
Cabbage (Brassica oleracea) Oilseed rape (Brassica napus) Soybean (Glycine max)	sprayer; 21-day observation.	NOAEC: 0.059 lb a.i./acre. Most sensitive dicot: Sugarbeet (emergence) EC ₂₅ : >1.8 lb a.i./acre. NOAEC: 0.0073 lb a.i./acre.	
Sugarbeet (<i>Beta</i> <i>vulgaris</i>) Sunflower (<i>Helianthus annuus</i>) Tomato (<i>Lycopersicon</i>		Significant reductions in seedling emergence compared to controls observed in ryegrass, sugarbeet, and wheat (10-64%). A significant reduction in survival found in corn, ryegrass, and wheat (18-92%) compared to negative control. Significant inhibition in height (35-91%) and dry weight (42-99%) for corn, ryegrass, and wheat.	
<i>esculentum</i>) 40 seeds/dose		No significant effects on emergence, survival, height, or weight were observed in cabbage, oilseed rape, onion, soybean, sunflower, or tomato. Treated cabbage, soybean, sugarbeet, and sunflower displayed slight phytotoxic effects; oilseed rape and onion displayed moderate phytotoxicity; and tomato, corn, ryegrass, and wheat displayed severe phytotoxicity.	

Prairie plant community:	Field study.	NOAEC: 0.469 lb a.i./acre. LOAEC: >0.469 lb a.i./acre.	LaBar and Schultz (2012)
Yarrow (Achillea millefolium L.)	(Poast; purity not reported) and nonionic surfactant (Agridex [®]).	Percent cover, flower density, and flower production were not significantly affected by treatment.	
Spreading dogbane (Apocynum androsaemifolium L)	Application rate: 526 g a.i./ha (equivalent to 0.469 lb a.i./acre).		
Deltoid balsamroot (<i>Balsamorhiza</i> <i>deltoidea</i> Nuttall)	Plots were sprayed from a tractor or a backpack sprayer; vegetation assessment began one week after spraying. Cover, density, and		
Common camas (<i>Camassia quamash</i> Pursh)	flower production were monitored. Location: Washington.		
Smooth hawksbeard (<i>Crepis capillaris</i> L.)			
Oregon sunshine (<i>Eriophyllum lanatum</i> Pursh)			
Cat's ear dandelion (<i>Hypochaeris</i> <i>radicata</i> L.)			
Oxeye daisy (<i>Leucanthemum</i> <i>vulgare</i> L.)			
Nine-leaved parsley (<i>Lomatium</i> <i>triternatum</i> Pursh)			

Species	Exposure	Response	Reference
Sickle-keeled lupine (<i>Lupinus albicaulis</i> Douglas)			
Slender cinquefoil (<i>Potentilla gracilis</i> Douglas)			
Common vetch (<i>Vicia</i> <i>sativa</i> L.)			
Wild oat (<i>Avena</i> <i>ludoviciana</i> Durieu.)	Formulated sethoxydim product (Nabo-S [®] ; purity: 12.5% a.i.).	Dry weight: ED ₅₀ : 80.0 g a.i./ha (0.07 lb a.i./acre).	Hammami et al. (2014)
15 plants/dose	Application rate: 0, 45, 94, 187, 281, and 375 g a.i./ha (equivalent to 0, 0.04, 0.08, 0.17, 0.25, and 0.33 lb a.i./acre).	Fresh weight: ED ₅₀ : 100.0 g a.i./ha (0.09 lb a.i./acre).	
	Applied via spray to 4-leaf stage seedlings. Evaluated growth four weeks after treatment.		

Species	Exposure	Response	Reference
Bioenergy crop (grass) cultivars (Andropogon gerardii, Arundo donax, Miscanthus spp., Panicum virgatum, Phalaris arundinacea)	 Formulated sethoxydim product (Poast; purity not reported) plus 1% crop oil concentrate. Application rate: 213 g a.i./ha (equivalent to 0.19 lb a.i./acre). Experiment 1: Sprayed on nine bioenergy cultivars within 24 hours of planting and evaluated 7, 21, and 35 days after treatment for visible injury, height, and shoot dry weight. Experiment 2: Sprayed on seven cultivars 70 days after planting and evaluated 7, 21, 35, and 49 days after treatment for visible injury, height, and shoot dry weight. 	 Experiment 1: NOAEC: 0.19 lb a.i./acre. LOAEC: >0.19 lb a.i./acre. Degree of injury, shoot height, and dry weight not significantly different from control. Experiment 2: NOAEC: <0.19 lb a.i./acre. LOAEC: 0.19 lb a.i./acre. LOAEC based on significantly increased rate of injury compared to controls in five cultivars (20-62% injury), significantly reduced height compared to controls in five cultivars (73-100% reduction), and significant reduction in shoot dry weight in three cultivars (27-55% reduction). 	Smith et al. (2015)

Abbreviations: a.i. = active ingredient; $EC_{25} = 25^{th}$ percentile effects concentration; ED_{50} = median effects dose; g = gram; ha = hectare; HHERA = Human Health and Ecological Risk Assessment; kg = kilogram; L = liter; lb = pound; LOAEC = lowest-observed-adverse-effect concentration; mg = milligram; NOAEC = no-observed-adverse-effect concentration; OM = organic matter; μ mol = micromolar

•		Response	Reference
Fathead minnow (<i>Pimephales</i> <i>promelas</i>), <24- hour-old embryos (100 eggs/ concentration)	Technical-grade sethoxydim (purity: 94.8% a.i.) in acetone. Nominal concentrations: 0 (negative and solvent controls), 0.63, 1.3, 2.5, 5, and 10 mg a.i./L. TWA concentrations: 0 (negative and solvent controls), 0.606, 1.23, 2.50, 4.86, and 9.59 mg a.i./L. 33-day early life-stage chronic toxicity test	33-day NOAEC: 4.86 mg a.i./L. 33-day LOAEC: 9.59 mg a.i./L. LOAEC based on treatment-related reductions in fry survival (58% survival in treatment group versus 86% survival in negative control) and standard length of surviving fry (17.4 mm in treatment group versus 18.3 mm in negative control). No treatment-related effects on time to hatch, egg hatchability, or wet weight of surviving fry. No	MRID 47691702 Aufderheige (2009) Acceptable/ Guideline
F (, µh ∈ (c	athead minnow <i>Pimephales</i> <i>promelas</i>), <24- nour-old embryos 100 eggs/ concentration)	Fathead minnow Pimephales nour-old embryos 100 eggs/ concentration)Technical-grade sethoxydim (purity: 94.8% a.i.) in acetone.Nominal concentrations: 0 (negative and solvent controls), 0.63, 1.3, 2.5, 5, and 10 mg a.i./L.Nominal concentrations: 0 (negative and solvent controls), 0.606, 1.23, 2.50, 4.86, and 9.59 mg a.i./L.33-day early life-stage chronic toxicity test under flow-through conditions	Fathead minnow Pimephales nour-old embryos 100 eggs/ concentration)Technical-grade sethoxydim (purity: 94.8% a.i.) in acetone.33-day NOAEC: 4.86 mg a.i./L. 33-day LOAEC: 9.59 mg a.i./L.Nominal concentrations: 0 (negative and solvent controls), 0.63, 1.3, 2.5, 5, and 10 mg a.i./L.LOAEC based on treatment-related reductions in fry survival (58% survival in treatment group versus 86% survival in negative control) and standard length of surviving fry (17.4 mm in treatment group versus 18.3 mm in negative control).TWA concentrations: 0 (negative and solvent controls), 0.606, 1.23, 2.50, 4.86, and 9.59 mg a.i./L.No treatment-related effects on time to hatch, egg hatchability, or wet weight of surviving fry. No treatment-related clinical signs were observed.

Table 5-4a. Studies of Toxicity to Fish of Technical-Grade Sethoxydim Published Since the 2001 HHERA

Study Basis	Species	Exposure	Response	Reference
Acute	Fathead minnow (<i>Pimephales</i> <i>promelas</i>) (20 fish/ concentration) Body weight at test termination: 0.076 ± 0.02 g (control fish)	Formulated sethoxydim product (Poast [®] ; purity: 19.6% a.i.). Nominal concentrations: 0 (negative control), 0.3, 0.4, 0.7, 1.2, and 2.0 mg a.i./L. Mean measured concentrations: 0 (negative control), 0.25, 0.41, 0.7, 1.2, and 2.1 mg a.i./L. 96-hour test under flow-through conditions.	 96-hour LC₅₀: 1.58 mg a.i./L. 96-hour NOAEC: 0.41 mg a.i./L. 96-hour LOAEC: 0.7 mg a.i./L. LOAEC based on sublethal effects (clinical signs of toxicity including 25% fish surfacing at 96 hours, and 40% fish laying on the bottom at 96 hours). Complete mortality observed at the highest concentration tested. Classified as "moderately toxic." 	MRID 47691701 Aufderheige (2009) Acceptable/ Guideline
Chronic	Fathead minnow (<i>Pimephales</i> <i>promelas</i>), <24- hour-old embryos (100 eggs/ concentration)	Formulated sethoxydim product (Poast; purity: 19.6%). Nominal concentrations: 0 (negative control), 0.06, 0.12, 0.25, 0.49, and 0.98 mg a.i./L. TWA concentrations: 0 (negative control), 0.0601, 0.117, 0.230, 0.474, and 0.934 mg a.i./L. 34-day early life-stage chronic toxicity test under flow-through conditions.	 34-day LC₅₀: 0.61 mg a.i./L. 34-day NOAEC: 0.23 mg a.i./L. 34-day LOAEC: 0.47 mg a.i./L. 34-day MATC: 0.33 mg a.i./L. LOAEC based on treatment-related reductions in standard length (17.8 mm in treatment group versus 18.7 mm in negative control) and dry weight (0.105 g in treatment group versus 0.127 g in negative control) of surviving fry. Post-hatch survival significantly reduced at 0.934 mg a.i./L (1% survival in treatment group versus 93% survival in negative control). No treatment-related effects on time to hatch or egg hatchability. 	MRID 47691703 Aufderheige (2009) Acceptable/ Guideline

Table 5-4b. Studies of Toxicity to Fish of a Formulated Sethoxydim Product Published Since the 2001 HHERA

Abbreviations: a.i. = active ingredient; HHERA = Human Health and Ecological Risk Assessment; LC₅₀ = median lethal concentration; g = gram; L = liter; LOAEC = lowestobserved-adverse-effect concentration; MATC = maximum acceptable toxicant concentration; mg = milligram; mm = millimeter; NOAEC = no-observed-adverse-effect concentration; TWA = time-weighted average

Table 5-5. Studies of Toxicity to Aquatic Invertebrates of Technical-Grade Sethoxydim and a Formulated Sethoxydim Product Published Since the 2001 HHERA

Туре	Species	Exposure	Response	Reference
Technical- Grade Sethoxydim	Freshwater water flea (<i>Daphnia magna</i>), <24 hours old (20/concentration)	Technical-grade sethoxydim (purity: 97.1% a.i.) in 0.1 mL/L dimethylformamide. Nominal concentrations: 0 (negative and solvent controls), 0.29, 0.92, 2.9, 9.4, and 30 mg a.i./L. Reviewer-calculated mean- measured concentrations: 0 (negative and solvent controls), 0.248, 0.821, 2.67, 8.46, and 28.5 mg a.i./L. 21-day flow-through test.	Growth: NOAEC: <0.248 mg a.i./L. LOAEC: 0.248 mg a.i./L. LOAEC based on significant reductions in total length (4.8 mm in treatment group versus 5.0 mm in negative control) and dry weight (0.94 mg in treatment group versus 1.23 mg in negative control). Reproductive endpoints: NOAEC: 2.67 mg a.i./L. LOAEC: 8.46 mg a.i./L. LOAEC based on significant reductions in number of live offspring (606 live offspring in treatment group versus 975 live offspring in negative control) and successful birth rate (birth rate of 11.9 in treatment group versus birth rate of 15.3 in negative control). No significant effects observed for parental survival.	MRID 50420001 Minderhout et al. (2017) Supplemental (qualitative)

Туре	Species	Exposure	Response	Reference
Formulated Sethoxydim Product	Freshwater bivalve (<i>Anodonta cygnea</i>) (12 adults/treatment)	Formulated sethoxydim product (Nabu [®] ; purity 20% a.i.). Application rate: 0 and 0.15 mg/L (equivalent to 0.03 mg a.i./L). One-hour exposure once/day for eight months. Evaluated for mortality and epithelium thickness.	NOAEC: <0.03 mg a.i./L. LOAEC: 0.03 mg a.i./L. LOAEC based on significant decrease in mean epithelium thickness compared to controls. No mortality observed during the experiment.	Lopes-Lima et al. (2006)

Abbreviations: a.i. = active ingredient; HHERA = Human Health and Ecological Risk Assessment; L = liter; LOAEC = lowest-observed-adverse-effect concentration;

mg = milligram; mL = milliliter; mm = millimeter; NOAEC = no-observed-adverse-effect concentration

Exposure	Response	Reference
Formulated sethoxydim product (Poast; purity:	Growth rate based on total leaf length:	MRID 48000902
19.3% a.i.).	21-day EC ₅₀ : 0.10 mg a.i./L.	Knauert (2010)
Nominal concentrations: 0 (negative control), 0.04, 0.1, 0.3, 0.9, 2.7, and 9.2 mg a.i./L.	21-day NOAEC: 0.0356 mg a.i./L.	Accentable /Nen
	21-day LOAEC: 0.177 mg a.i./L.	Acceptable/Non-
Initial-measured concentrations: <loq (negative="" 0.0398,="" 0.0926,="" 0.311,="" 1.03,="" 10.1="" 2.95,="" a.i.="" and="" control),="" l.<="" mg="" td=""><td>LOAEC based on 10-95% reduction in total leaf length</td><td>guidenne</td></loq>	LOAEC based on 10-95% reduction in total leaf length	guidenne
	compared to control.	
	Growth rate based on dry weight:	
Reviewer-calculated TWA concentrations: <loq (negative control), 0.0128, 0.0356, 0.177, 0.699, 2.26, and 7.74 mg a.i./L.</loq 	21-day EC ₅₀ : 2.1 mg a.i./L.	
	21-day NOAEC: 0.0356 mg a.i./L.	
	21-day LOAEC: 0.177 mg a.i./L.	
21-day static test.	LOAEC based on 7-52% reduction in dry weight compared	
Day 1 measured test concentrations were 81-106% of nominal concentrations. Day 7 measured test	to control.	
	Signs of toxicity observed in concentrations of ≥0.177 mg	
concentrations were 26-86% of nominal	a.i./L included leaf necrosis and reduced rhizome	
concentrations. Day 14 measured test	development.	
concentrations were 33-69% of nominal		
concentrations. Day 21 measured test		
concentrations were 23-67% of nominal concentrations, and 22-65% of initial measured		
concentrations, and 22-05% of mitial measured		
both initial and TWA concentrations; toxicity		
values for TWA concentrations are reported here.		
E F1 NC c1 F(2 2 Eccccccckv	 Seposure Formulated sethoxydim product (Poast; purity: 19.3% a.i.). Nominal concentrations: 0 (negative control), 0.04, 0.1, 0.3, 0.9, 2.7, and 9.2 mg a.i./L. Initial-measured concentrations: <loq (negative="" 0.0.1="" 0.0398,="" 0.0926,="" 0.311,="" 1.03,="" 2.95,="" a.i.="" and="" control),="" l.<="" li="" mg=""> Reviewer-calculated TWA concentrations: <loq 0.0128,="" 0.0356,="" 0.177,="" 0.699,="" 2.26,="" 7.74="" a.i.="" and="" control),="" l.<="" li="" mg="" negative=""> Perioday static test. Day 1 measured test concentrations were 81-106% of nominal concentrations. Day 7 measured test concentrations were 81-106% of nominal concentrations. Day 7 measured test concentrations were 33-69% of nominal concentrations. Day 21 measured test concentrations were 23-67% of nominal concentrations. DER reported toxicity values for poth initial and TWA concentrations; toxicity values for TWA concentrations are reported here. </loq></loq>	ExposureResponseFormulated sethoxydim product (Poast; purity: (9.3% a.i.).Growth rate based on total leaf length: (21-day ECso: 0.10 mg a.i./L. (21-day NOAEC: 0.0356 mg a.i./L.

Abbreviations: a.i. = active ingredient; DER = Data Evaluation Record; EC₅₀ = median effects concentration; HHERA = Human Health and Ecological Risk Assessment; L = liter; LOAEC = lowest-observed-adverse-effect concentration; LOQ = limit of quantification; mg = milligram; NOAEC = no-observed-adverse-effect concentration; TWA = time-weighted average

Туре	Species	Exposure	Response	Reference
Technical- Grade Sethoxydim	Microalgae/ phytoplankton (<i>Chlorella</i> <i>sorokiniana</i>), three cultures/ concentration	Technical-grade sethoxydim (purity not reported). Nominal concentrations: 0.05, 0.08, or 0.1% v/v (equivalent to 521.5, 834.4, and 1043 mg a.i./L). Cultures exposed for one week and then evaluated for dry weight, total chlorophyll content, total carotenoids content, and optical density.	Optical density: NOAEC: 521.5 mg a.i./L. LOAEC: 834.4 mg a.i./L. LOAEC based on higher optical densities (approximately 1.4-2.2) in all strains compared to controls (approximately 1.2). Total chlorophyll and carotenoids: NOAEC: <521.5 mg a.i./L. LOAEC: 521.5 mg a.i./L. Significant decreases in total chlorophyll (≤ 3 µg/L in treated cultures versus 4-10 µg/L in controls) and carotenoids (≤ 0.5 µg/L in treated cultures versus 1- 2 µg/L in controls) were noted at all concentrations compared to controls.	Chiellini et al. (2020)
			Dry weight: NOAEC: 1043 mg a.i./L. LOAEC: >1043 mg a.i./L.	
			No significant differences observed for dry weight between treatment and control groups.	

Table 5-7. Studies of Toxicity to Algae of Technical-Grade Sethoxydim and a Formulated Sethoxydim Product Published Since the 2001 HHERA

Туре	Species	Exposure	Response	Reference
Technical- Grade Sethoxydim	Microalgae/ phytoplankton (<i>Nannochloris</i> oculata)	Assumed technical-grade sethoxydim (purity not reported). Nominal concentrations: 0, 0.1, 1, and 5 mg a.i./L. Treatments added to growth medium of algal culture. Growth rate determined at two-day intervals for 40 days. Biomass and total lipid content were determined.	Biomass: NOAEC: 5 mg a.i./L. LOAEC: >5 mg a.i./L. No treatment-related effects on growth compared to controls were found. Lipid content: NOAEC: <0.1 mg a.i./L. LOAEC: 0.1 mg a.i./L. LOAEC based on reduced lipid content (7.3-7.7% in treated cultures versus 13.3% in controls).	Deng et al. (2015)
Technical- Grade Sethoxydim	Green algae (Raphidocelis subcapitata, Desmodesmus subspicatus), diatoms (Achnanthidium minutissimum, Navicula pelliculosa, Nitzschia palea), cyanobacteria (Pseudanabaena foetida, Synechococcus leopoliensis)	Assumed technical-grade sethoxydim (purity not reported) in 0.1% v/v DMSO. Nominal concentrations: 0, 0.006, 0.019, 0.06, 0.19, 0.6, 1.9, and 6 mg a.i./L. Fluorometric algal toxicity assay; standardized algal growth inhibition test. Growth measured daily for four days.	EC ₅₀ : >6 mg a.i./L. NOAEC: 6 mg a.i./L. LOAEC: >6 mg a.i./L. No significant effects on growth were observed compared to controls.	Nagai (2019)

Туре	Species	Exposure	Response	Reference
Technical- Grade Sethoxydim	Microalgae (Dunaliella primolecta)	Assumed technical-grade sethoxydim (purity not reported). Nominal concentrations ranged from 0 to 1000 mg a.i./L (no further details reported). 96-hour culture; estimated cell density.	96-hour EC ₅₀ : 87.63 mg a.i./L. 96-hour EC ₁₀ : 23.32 mg a.i./L. Based on growth inhibition.	Santín- Montanyá et al. (2007)
Formulated Sethoxydim Product	Microalgae (Chlorella vulgaris)	Formulated sethoxydim product (Bonide Grass Beater with Poast Plus [®] ; purity 13% a.i.). Nominal concentration: 0 and 0.08% (v/v) (equivalent to 108.5 mg a.i./L). Cells were exposed at 36 hours and evaluated at 15 minutes and one hour post-exposure. Separately, cells were exposed to 293 μM technical-grade sethoxydim (equivalent to 96 mg a.i./L) in mineral spirits and evaluated for cell viability at 30 minutes post-exposure.	NOAEC: <108.5 mg a.i./L. LOAEC: 108.5 mg a.i./L. LOAEC based on decreased photosynthesis (49% decrease in chlorophyll a by 48 hours), membrane fragmentation (beginning at 15 minutes), and cell death (45% viability 15 minutes after treatment, 12% viability 30 minutes after treatment, and 0% viability one hour post-treatment) compared to controls. Technical sethoxydim (cell viability): NOAEC: 96 mg a.i./L LOAEC: >96 mg a.i./L	Smythers et al. (2019)

Abbreviations: a.i. = active ingredient; DMSO = dimethylsulfoxide; EC10 = 10^{th} percentile effects concentration; EC₅₀ = median effects concentration; HHERA = Human Health and Ecological Risk Assessment; L = liter; LOAEC = lowest-observed-adverse-effect concentration; mg = milligram; NOAEC = no-observed-adverse-effect concentration; v/v = volume per volume concentration; μ g = microgram; μ M = micromolar