

# DuPont™ Throttle™ XP

herbicide

## Technical Bulletin



### IDENTITY OF ACTIVE INGREDIENT

#### Chemical Names

- (a) 2-Chloro-N-[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)aminocarbonyl] benzenesulfonamide
- (b) Methyl 2-[[[(4,6-dimethyl-2-pyrimidinyl)-amino] carbonyl]amino]sulfonyl]benzoate
- (c) N-[2,4-dichloro-5-[(4-difluoromethyl)-4,5-dihydro-3-methyl-5-oxo-1H-1,2,4-triazol-1-yl]phenyl]methane-sulfonamide

#### Common Names

- (a) Chlorsulfuron
- (b) Sulfometuron methyl
- (c) Sulfentrazone

#### % Active Ingredient

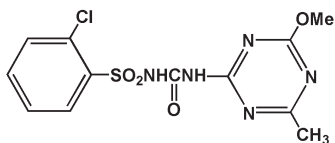
- 9
- 18
- 48

#### Molecular Weight

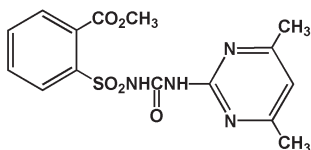
- (a) 357.77
- (b) 364.38
- (c) 387.2

#### Structural Formulas

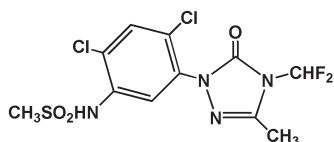
(a)



(b)



(c)



#### Chemical Families

- (a, b) Sulfonylureas
- (c) Aryl triazinone

#### CAS Registry Number

- (a) 64902-72-3
- (b) 74222-97-2
- (c) 122836-35-5

#### Empirical Formula

- (a) C<sub>12</sub>H<sub>12</sub>ClN<sub>5</sub>O<sub>4</sub>S
- (b) C<sub>15</sub>H<sub>16</sub>N<sub>4</sub>O<sub>5</sub>S
- (c) C<sub>11</sub>H<sub>10</sub>C<sub>12</sub>F<sub>2</sub>N<sub>4</sub>O<sub>3</sub>S

#### US EPA Registration No(s).

- DuPont™ Throttle™ XP 352 - 575
- (a) 352 - 516
- (b) 352 - 554
- (c) 279 - 3149

### PHYSICAL AND CHEMICAL PROPERTIES OF THE INGREDIENTS

#### State

- (a) Solid
- (b) Solid
- (c) Solid

#### Color

- (a) White
- (b) White
- (c) Tan

#### Odor

- (a) Odorless
- (b) Odorless
- (c) Musty

#### Boiling Point

- (a) NA
- (b) NA
- (c) NA

#### Melting Point

- (a) 174 - 178°C
- (b) 203 - 205°C
- (c) 121 - 123°C

#### Density

- (a) 0.64 g/ml
- (b) 0.73 g/ml
- (c) 0.53 g/ml at 20°C

**Solubility in Water**

- (a) 876 ppm at pH 5; 12,560 ppm at pH 7
- (b) 6.4 ppm at pH 5; 244 ppm at pH 7
- (c) 780 mg/L

**Vapor pressure**

- (a)  $2.93 \times 10^{-11}$  mm Hg at 25°C
- (b)  $7.2 \times 10^{-14}$  Pa at 25°C
- (c)  $1.07 \times 10^{-7}$  Pa at 25°C

**Octanol/Water Partition Coefficient ( $K_{ow}$ )**

- (a) 2.13 at pH 5  
0.10 at pH 7  
0.04 at pH 9
- (b) 10.2 at pH 5  
0.35 at pH 7  
0.01 at pH 9
- (c) 9.8 at pH 7

**Stability**

- (a) Stable at room temperature
- (b) Stable at room temperature
- (c) Stable at room temperature

**Oxidizing/Reducing Activity**

- (a, b, c) Not available

**Flammability**

- (a) Product is dry and noncombustible
- (b) Product is dry and noncombustible
- (c) Slightly combustible at elevated temperatures

**Explosibility**

- (a) Not an explosion hazard
- (b) Not a fire or explosion hazard
- (c) Slightly combustible

**Storage Stability**

- (a) Stable at normal temperatures and storage conditions.
- (b) Stable at normal temperatures and storage conditions.
- (c) Store in a cool, dry, well ventilated place. Do not use or store near heat, open flame or hot surfaces.

**Viscosity**

- (a, b, c) NA

**Miscibility**

- (a, b, c) NA

**Corrosion Characteristics**

- (a) Noncorrosive
- (b) Noncorrosive
- (c) Noncorrosive

**BIOLOGICAL ACTIVITY AND USE****General Information**

DuPont™ Throttle™ XP herbicide is formulated as a water dispersible granule to be mixed in water and applied as a spray at non-crop sites for the control of susceptible annual and perennial broadleaf and grass weeds. Throttle™ XP is recommended for general weed control on private, public and military lands as follows: uncultivated nonagricultural areas (such as airports, highway, railroad and utility rights-of-way and sewage disposal areas); uncultivated agricultural areas (non-crop producing, which includes: farmyards, fuel storage areas, fence rows, barrier strips); industrial sites (outdoor, such as lumberyards, pipeline and tank farms).

This product may be applied on non-crop sites that contain areas of temporary surface water caused by collection of water in equipment ruts or in other depressions created by management activities. It is permissible to treat intermittently flooded low-lying areas, seasonally dry flood plains and transitional areas between upland and lowland sites when no water is present. It is also permissible to treat marshes, swamps and bogs after water has receded, as in seasonally dry flood deltas. Do not make applications to natural or man-made bodies of water such as lakes, reservoirs, ponds, streams and canals.

**Mode of Action**

Throttle™ XP is a blended product that employs two distinctly different modes of action in controlling susceptible broadleaf weeds, grasses and sedges. The sulfentrazone portion of the product inhibits the enzyme, protoporphyrinogen oxidase (protox), a pivotal enzyme in chlorophyll biosynthetic pathway causing a buildup of peroxide-like compounds, causing the plant cell membrane to rupture. The chlorsulfuron and sulfometuron methyl portions inhibit acetolactate synthase (ALS), a key enzyme in plants needed in the biosynthesis of the branched amino acids isoleucine, leucine and valine. Animals do not possess this enzyme to synthesize proteins.

### **Use Rate and Biological Activity**

DuPont™ Throttle™ XP is to be applied at a use rate of 12.5 ounces of product per acre. When applied as a spray, Throttle™ XP is absorbed by both roots and foliage of plants, rapidly inhibiting the growth of susceptible weeds. Warm, moist conditions following application accelerate the herbicidal activity of Throttle™ XP; cold, dry conditions delay the herbicidal activity. Weeds hardened off by drought or other plant stresses are less susceptible to Throttle™ XP.

Low rates of Throttle™ XP can kill or severely injure most crops. Following a Throttle™ XP application, the use of the spray equipment to apply other pesticides to crops on which Throttle™ XP or its active ingredients are not registered may result in their damage. The most effective way to reduce this crop damage potential is to use dedicated mixing and application equipment.

### **Weeds Controlled**

Throttle™ XP controls more than 135 broadleaf weeds and grasses, including dandelion, Canada thistle, kochia, Russian thistle, perennial pepperweed, pigweeds, bahiagrass, downy brome, barnyardgrass, foxtails and medusahead. The degree and duration of control may depend on the weed spectrum and infestation intensity, weed size at application, soil type, organic matter content and environmental conditions at and following application.

### **Uptake, Absorption and Translocation Characteristics**

The compounds that make up Throttle™ XP herbicide are similar in many ways. **(a,b)** Chlorsulfuron and sulfometuron methyl are both rapidly taken up by both the roots and foliage of plants. Chlorsulfuron translocates readily in the xylem following root absorption, but less so in the phloem after foliar applications. Sulfometuron methyl translocates in both the xylem and phloem, although not extensively. Sulfometuron methyl moves in the xylem and by mass flow with phloem solutes. Both accumulate in the meristematic areas of plants. **(c)** Sulfentrazone is taken up by the roots of the plants following soil application; however, foliar contact causes rapid desiccation and necroses of exposed plant tissues of sensitive species. Plants emerging from treated soil die after exposure to light. Symplastic phloem movement is assumed to be limited, because of the rapid foliar desiccation caused by this herbicide.

### **Soil Activity and Degradation**

**(a)** Chlorsulfuron has moderate affinity for soil organic matter (OM), but adsorption to clay is low. Some photodegradation occurs under field conditions and microbial breakdown is relatively more important in alkaline soils. Chemical hydrolysis plays an important role in chlorsulfuron breakdown, but rates are slow at pH 7.5 to 8 and increase as pH decreases. The sulfonylurea bridge is cleaved through hydrolysis to form inactive products. The average laboratory soil half-life is 46 days (corrected to 25° C) and is dependent upon soil pH. The half-life is shorter in lower pH soils (13 days in soils of pH < 6.0; 32 days in soils of pH 6.0 to < 7.5) and longer in higher pH soils (75 days in soils of pH > 7.5). Field studies at three sites with soils of pH > 7.5 showed an average half-life of 53 days, demonstrating that field soil dissipation can be faster than that exhibited under laboratory conditions. Based upon laboratory adsorption-desorption studies chlorsulfuron is considered to be moderately mobile in soils of high pH, with less potential for leaching at pH < 6. However, field studies conducted in high pH soils over a year and a half have shown that most of the chlorsulfuron applied to soil remains in the plow layer (upper 30 cm).

**(b)** Photodegradation is believed to play a minor role in the overall degradation of sulfometuron methyl under field conditions. Chemical hydrolysis is moderately rapid at pH 6, but extremely slow at pH 8. Microbial breakdown is relatively more important in alkaline soils where chemical hydrolysis is slower. Field half-lives average 37 days at pH < 7 and 49 days at pH 7. Persistence is increased by cool temperatures and generally by higher pH. Potential soil mobility is generally greater at higher pH and lower OM content. **(c)** Sulfentrazone is relatively stable to hydrolysis (half-lives at pH 5, 7 and 9 of 143, 207 and 375 days, respectively), and is not susceptible to photodegradation or volatility following application to soil. However, sulfentrazone is extremely susceptible to direct photolysis in water. Sulfentrazone has a low affinity for organic matter and also has shown low to intermediate soil sorption ( $K_{oc} = 43$ ). Soil degradation occurs primarily by microbial activity and the average laboratory soil half-life is 540 days. Laboratory studies indicate that sulfentrazone is potentially mobile in soils with high sand content and is known to leach through soil into groundwater under certain conditions. Do not use on coarse soils classified as sands which also have less than 1 percent organic matter.

### Plant Selectivity, Sensitivity and Residues

DuPont™ Throttle™ XP herbicide is registered for use in non-crop situations only and care should be exercised when it is used in the vicinity of crop plants. Exposure to Throttle™ XP may injure or kill most crops.

### Metabolism in Plants

(a,b) Plant species vary widely in their ability to metabolize sulfonyleurea products. The ability to metabolize or detoxify these products is the basis for the selectivity shown by tolerant versus susceptible plant species. Tolerant plants convert or break down chlorsulfuron and sulfometuron methyl to herbicidally inactive products much faster than do sensitive plants.

(c) **Sulfentrazone** is rapidly metabolized in soybeans, leading to a number of metabolic transformations. The major pathway involves oxidative hydroxylation of the methyl group of the triazole ring, followed by further oxidation of the hydroxymethyl function to form a carboxylic function, which is eventually decarboxylated. A second pathway involves cleavage of the methanesulfonamid function of the phenyl ring.

### Toxicity and Metabolism in Animals

**Chorsulfuron and sulfometuron methyl** have low toxicity to mammals, birds and insects. These compounds do not bio-accumulate in warm or cold-blooded animals. Chlorsulfuron and sulfometuron are rapidly absorbed and eliminated.

**Sulfentrazone:** A metabolism study in rats indicated that approximately 84 percent to 104 percent of the orally administered dose of sulfentrazone was excreted in the urine, and that the pooled urinary radioactivity consisted almost entirely of 3-hydroxymethyl sulfentrazone. Most of the test article was eliminated by urine and feces within 72 hours, and appeared to be independent of dose and sex. There will be no animal feed items associated with the proposed use since the product is labeled for vegetation management.

The three compounds that make up Throttle™ herbicide do not bio-accumulate in warm- or cold-blooded animals.

## FATE AND BEHAVIOR IN THE ENVIRONMENT

(See section on "Soil Activity and Degradation")

Use rate	Dissociation constant
12.5 ounces product per acre	(a) 3.6 at 25°C (b) 5.2 (c) 6.56
Soil sorption coefficient	
(a) Koc: Average is 34 mL/g and ranged from 13 to 58 in 4 soils. Kd: Average is 0.39 mL/g and ranged from 0.08 to 0.89.	
(b) Koc: Average is 88 mL/g and ranged from 63 to 126 in 4 soils. Kd: Average is 1.38 and ranged from 0.71 to 2.85.	
(c) Koc: Average is 43 mL/g and ranged from 26 to 77 in 4 soils. Kd: Ranged from 0.2 to 0.8.	

**RESIDUES IN FOOD — Not Applicable. For non-crop use only.**

## TOXICITY OF TECHNICAL ACTIVE INGREDIENT

Acute Toxicity — Chlorsulfuron	
Acute oral toxicity — rodent	5544 mg/kg
Acute dermal toxicity — rabbit	3400 mg/kg
Acute inhalation toxicity — rodent	≥ 5.5 mg/L/4 hrs
Skin irritation — rabbit	None
Eye irritation — rabbit	Moderate
Skin sensitization — guinea pig	Negative

Acute Toxicity — Sulfometuron methyl	
Acute oral toxicity — rodent	5000 mg/kg
Acute dermal toxicity — rabbit	2000 mg/kg
Acute inhalation toxicity — rodent	5 mg/L
Skin irritation — rabbit	None
Eye irritation — rabbit	Mild
Skin sensitization — guinea pig	Negative

Acute Toxicity — Sulfentrazone	
Acute oral toxicity — rodent	2689 mg/kg
Acute dermal toxicity — rabbit	2000 mg/kg
Acute inhalation toxicity — rodent	4.13 mg/L
Skin irritation — rabbit	None
Eye irritation — rabbit	Mild irritant
Skin sensitization — guinea pig	Negative

Sulfentrazone has low oral, dermal and inhalation toxicity. It is mildly irritating to the eyes and non-irritating to the skin. Signs of toxicity in laboratory animals included clonic convulsions, ataxia, hypersensitivity to touch, chromorhinorrhea, abdominogenital staining, decreased locomotion, lacrimation, nasal discharge and squinting eyes. Effects observed in laboratory animals after acute inhalation of toluene included mucous membrane irritation, motor incoordination, prostration, changes in respiratory rate, changes in serum and blood enzyme activities, elevated blood glucose and packed cell volume, decreased body weight and death. Vomiting after ingestion of this product may cause aspiration of toluene into the lungs, which may result in fatal pulmonary edema.

### Subchronic Toxicity — Chlorsulfuron

Subchronic toxicity — rodent	NOEL: 2500 ppm
Subchronic toxicity — dog	NOEL: 500 ppm
Repeated dose dermal toxicity — rat, rabbit or guinea pig	NA

### Subchronic Toxicity — Sulfometuron methyl

Subchronic toxicity — rodent	NOEL: 1000 ppm
Subchronic toxicity — dog	NOEL: 200 ppm
Repeated dose dermal toxicity — rat, rabbit or guinea pig	2000 mg/kg/d

### Subchronic Toxicity — Sulfentrazone

Subchronic toxicity — rodent	NOEL female: 23.1 mg/kg/d
Subchronic toxicity — dog	NOEL: 28 mg/kg/d
Repeated dose dermal toxicity — rat, rabbit or guinea pig	NA

### Chronic Toxicity & Carcinogenicity

Rodent — chlorsulfuron	Not oncogenic
Rodent — sulfometuron methyl	Not oncogenic
Rodent — sulfentrazone	Not carcinogenic

Sulfentrazone was not carcinogenic in lifetime feeding studies with laboratory animals, nor was it found to be mutagenic in a battery of tests.

### Reproductive Toxicity — Chlorsulfuron

Teratology — rodent	NOEL maternal: 165 mg/kg/d NOEL fetal: 500 mg/kg/d Not teratogenic
Teratology — rabbit	NOEL maternal: 75 mg/kg/d NOEL fetal: 200 mg/kg/d Not teratogenic
Multigeneration reproductive toxicity — rodent	NOEL for reproductive toxicity: 7500 ppm NOEL for systemic toxicity: 2500 ppm
Multigeneration reproductive toxicity — non-rodent	NOAEL systemic parental toxicity: 151 mg/kg bw/d NOAEL reproductive/fertility: 498 mg/kg bw/d NOAEL off-spring: 498 mg/kg bw/d

### Reproductive Toxicity — Sulfometuron methyl

Teratology — rodent	NOEL maternal and fetal: 90.6 mg/kg/d Not teratogenic
Teratology — rabbit	NOEL maternal and fetal: 300 mg/kg/d Not teratogenic
Multigeneration reproductive toxicity — rodent	NOEL 500 ppm; reduced maternal body weights and smaller litters at 5000 ppm

### Reproductive Toxicity — Sulfentrazone

Teratology — rodent (oral)	NOEL maternal: > 25 mg/kg/d NOEL fetal: 10 mg/kg/d
Teratology — rabbit	NOEL maternal and fetal: 100 mg/kg/d
Multigeneration reproductive toxicity — rodent	There were adverse effects in this study, including effects on growth and survival of the offspring, on the testes, and on sperm production.

In a reproduction study, sulfentrazone produced adverse effects on the growth and survival of the offspring, decreased male fertility and oligospermia at 25 mg/kg/day, and 35 mg/kg/day.

Sulfentrazone was found to be fetotoxic in oral and dermal developmental toxicity studies; the fetal NOELs were 10 mg/kg/day and 100 mg/kg/day, respectively.

Genotoxicity — Chlorsulfuron	
Ames bacterial mutagenicity assay	Negative
Other: structural chromosome aberration	Negative
Other: DNA damage/repair	Rat hepatocytes/UDS, negative

Genotoxicity — Sulfentrazone	
Ames bacterial mutagenicity assay	Not mutagenic
Other: mouse lymphoma	Not mutagenic

Neurotoxicity — Sulfentrazone
Technical acute neurotoxicity screen in rats: No adverse effects. NOEL (M/F) = 250 mg/kg (based on clinical signs and motor activity decrease).

Genotoxicity — Sulfometuron methyl	
Ames bacterial mutagenicity assay	Negative
Other: structural chromosome aberration	Negative

## HUMAN EXPOSURE, RISK AND SAFETY INFORMATION

Chlorsulfuron	
PEL (OSHA)	None established
TLV (ACGIH)	None established
AEL* (DuPont): TWA	10 mg/m <sup>3</sup> , 8 & 12 hr TWA
PPE (Personal Protective Equipment)	<p>Applicators and other handlers must wear:</p> <ul style="list-style-type: none"> <li>— Long-sleeved shirt and long pants.</li> <li>— Chemical-resistant gloves made of any waterproof material such as polyethylene or polyvinyl chloride.</li> <li>— Shoes plus socks.</li> <li>— Avoid contact with eyes, skin or clothing. Avoid breathing vapors or spray mist. Wash thoroughly with soap and water after handling. Remove and wash contaminated clothing before reuse.</li> </ul>
<p>* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.</p> <p>Chlorsulfuron: <b>In case of contact with eyes</b>, hold eye open and rinse slowly and gently with water for 15 to 20 minutes. Call a poison control center or doctor for further treatment advice.</p>	

Sulfometuron methyl	
PEL (OSHA)	None established
TLV (ACGIH)	5 mg/m <sup>3</sup> , 8 hr. TWA, A4
AEL* (DuPont) : TWA	10 mg/m <sup>3</sup> , 8 & 12 hr. TWA total dust
PPE (Personal Protective Equipment)	<p>Applicators and other handlers must wear: Long-sleeved shirt and long pants. Shoes plus socks. Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.</p>
<p>* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.</p> <p>Sulfometuron methyl: <b>In case of contact with eyes</b>, hold eye open and rinse slowly and gently with water for 15 to 20 minutes. Call a poison control center or doctor for further treatment advice.</p>	

### Sulfentrazone

PEL (OSHA)	Particulates (not otherwise regulated) 15 mg/m <sup>3</sup> , 8 hr. TWA, total dust 5 mg/m <sup>3</sup> , 8 hr. TWA, respirable dust
AEL (DuPont)	2 mg/m <sup>3</sup> , 8 & 12 hr. TWA, total dust
<b>Toluene</b> PEL (OSHA)	200 ppm, 8 hr. TWA 300 ppm, ceiling 500 ppm, 10 min. max
TLV (ACGIH)	50 ppm, 8 & 12 hr. TWA
AEL (DuPont)	50 ppm, 8 & 12 hr. TWA
PPE (Personal Protective Equipment)	Applicators and other handlers must wear: Long-sleeved shirt and long pants. Shoes plus socks. Waterproof gloves. Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product. Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

Chronic exposure to excessive toluene levels may cause headaches, dizziness, loss of sensations or feelings (such as numbness), and liver and kidney damage. Inhalation of toluene vapors at high doses have also resulted in an increased incidence of malformations and decreased fetal weight in laboratory animals. Toluene is a minor impurity in DuPont™ Throttle™ XP herbicide; therefore, exposures that will result in the above effects are not considered likely when used according to the product label.

## WILDLIFE AND OTHER NON-TARGET SPECIES

### Chlorsulfuron

Avian species — LD <sub>50</sub>	Mallard duck	> 5000 mg/kg/d
Aquatic species — LC <sub>50</sub>	Sheepshead minnow	> 980 mg/L
	Rainbow trout	> 250 mg/L
Terrestrial invertebrates (bees) — Oral and contact LD <sub>50</sub>	Honeybee	> 25 µg /bee

### Sulfometuron methyl

Avian species — LD <sub>50</sub>	Bob white quail	> 5620 mg/kg/d
	Mallard duck	> 5000 mg/kg/d
Aquatic species — LC <sub>50</sub>	Bluegill sunfish	12.5 mg/L
	Rainbow trout	12.5 mg/L
Terrestrial invertebrates (bees) — LD <sub>50</sub>	Honeybee	> 100 µg/bee

### Sulfentrazone

Avian species - LD <sub>50</sub>	Bob white quail	> 5620 mg/kg/d
	Mallard duck	> 2250 mg/kg/d
Aquatic species - LC <sub>50</sub>	Bluegill sunfish	93.8 mg/L
	Rainbow trout	≥ 120 mg/L
Terrestrial invertebrates (bees) - LD <sub>50</sub>	Honeybee	— Not available

## Chlorsulfuron

### Primary Industry Source: DuPont.

1. Brown, H.M. 1990. Mode of action, crop selectivity, and soil relations of the sulfonylurea herbicides. *Pesticide Science*. 29:263-281.
2. Joshi, M.M., Brown, H.M., Romesser, J.A. 1985. Degradation of chlorsulfuron by soil microorganisms. *Weed Science*. 33 (6):888-893.
3. LaRossa and Schloss. 1984. *J. Biol. Chem.* 259:8753.
4. Wauchope, R. D. et al. 1992. *Rev. Environ. Contam. Toxicol.* 123:1.
5. Schmuckler, M.E. et al. 2000. *Pest Management Science*. 56:521.
6. Strek, H.J. 1998. Fate of chlorsulfuron in the environment. 1. Laboratory evaluations. *Pesticide Science*. 53 (1):29-51.
7. Strek, H.J. 1998. Fate of chlorsulfuron in the environment. 2. Field evaluations. *Pesticide Science*. 53 (1):52-70.

## Sulfentrazone

### Primary Industry Source: FMC Corporation.

## Sulfometuron methyl

### Primary Industry Source: DuPont.

1. Anderson, J.J.; Dulka, J.J. 1985. Environmental fate of sulfometuron methyl in aerobic soils. *Journal of Agricultural and Food Chemistry*. 33 (4):596-602.
2. Baird, J. H. et al. 1989. *Weed Sci.* 31:42.
3. LaRossa and Schloss. 1984. *J. Biol. Chem.* 259:8753.
4. Wauchope, R. D. et al. 1992. *Rev. Environ. Contam. Toxicol.* 123:1.
5. Roberts, T. 1998. *Metabolic Pathways of Agrochemicals*, Vol. 1, 552.
6. Schmuckler, M.E. et al. 2000. *Pest Management Science*. 56:521.
7. Trubey, R.K, Bethem, R. A. & Peterson, B. 1998. Degradation and mobility of sulfometuron methyl (Oust® herbicide) in field soil. *Journal of Agricultural and Food Chemistry*. 46 (6):2360-2367.

Throttle™ XP is not available in all states. See your local DuPont retailer or representative for details and availability in your state.

***This reference guide is not intended as a substitute for the product label for the products referenced herein. Product labels for the above products contain important precautions, directions for use and product warranty and liability limitations that must be read before using the product. Applicators must be in possession of the product label(s) at the time of application. Always read and follow all label directions and precautions for use when using any pesticide alone or in tank mix combinations.***

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